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Motse oa Batsoali

INVESTIGATING INTO BUILDING SPACES TO
TREAT ALZHEIMER'S AND DEMENTIA PATIENTS





682999
KAMOHELO MOTOPI

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Abstract

This research focuses on investigating the Architecture of healthcare focusing on facilities intellectual disabilities in a Sub-Saharan African context. The research on creating positive, calming and homely environments that connect with its surrounding environment. This should amplify and complements nature. Furthermore, there is a focus on values that have consequences for elderly patients with disabilities in a residential setting and in a healthcare setting. There needs to be an Architectural environment that can adapt with the changing needs of patients with intellectual disabilities and care space. There needs to be an architectural environment that can adapt to the changing physical and mental states of the residents over time. A healthcare centre has been developed to be suitable for residents for patients with high cognitive abilities. This healthcare addresses the ever-changing dynamics of Alzheimer's and Dementia. There is a technical focus on materiality, daylight, landscape and indoor climate.

Case studies of previous successful projects will be investigated. The knowledge learned from these case studies will be beneficial and will inform all aspects of the research. The process will use design by digital means for future scholars investigating similar projects.

Keywords:

Retirement Village, Assisted Care, Small Town, Training centre, Teaching centre, Wellness Centre, Nursing Home, Mobile Care, Intellectual Disability

Introduction

BACKGROUND

When my grandfather was diagnosed with Dementia, I needed to take care of him because I was the remaining child of my family. The visits to the Doctor were highly challenging as the closest specialists in Dementia and Alzheimer's were in Bloemfontein, 2 hours away from our home. These trips are tolling families, especially when doctors need tests with other doctors, new appointments, and more tests and, more times than many, not enough information on the correct treatment. Had there been a place close by for us to take my grandfather, it would not be as taxing as planning a short trip.



Figure 2 Elderly care Diagram

In 2017 the World Alzheimer's report estimated that approximately 187 000 people over 60 live in South Africa with Dementia. Healthcare services for the elderly have frail care services (National Institute on Aging 2017). In South Africa, we do not have enough infrastructure specifically designed to meet these needs. Although studies focus on making cities more accessible to our elderly, this research focuses on a specific frail care illness and the power architecture can have in their treatment. This dissertation will focus on Elderly care, Alzheimer's, and Dementia and how Architecture can help build better spaces for patients suffering from intellectual disabilities.



Figure 1 Intellectual Disability Diagram

The research gives an overview of intellectual disabilities, an understanding of Alzheimer's and Dementia, and more prone diseases and risks elderly citizens are prone to face. Observing Alzheimer's and dementia patients will help us understand how to design for elderly patients in a healthcare setting. The project looks into types of clinics and an understanding of garden theory (how the placement of specific vegetation with correct colour combinations is better for the user), universal access, biophilic, and healthcare design as strategies for the centre.

Healthcare Design is the following section that investigates Architectural design. This design will examine why certain design features benefit their patients' healthcare.
Following, we look at precedents of South African centres and case studies of centres and hospitals.

Methods

MOTIVATION AND RELEVANCE



Figure 3 Motivation & Experience Diagram

Nurses' assistants focus on cities and large towns when investigating retirement villages and nursing homes. Even for those who can afford private health care, primarily medical aid, Discovery medical aid verified nurses are only acceptable for Johannesburg and Western Cape residents (The Discovery Health Medical Scheme n.d.).

Although the government has planned to address healthcare with a national healthcare insurance plan, it is still struggling to address the issue nationwide, the government aimed to reach 6.7 million people (Government of South Africa 2020). There TB, and mental health issues by 2024 but the NHI does not have enough basis across South Africa. It seems to be a sizeable missing gap for elderly healthcare in the smaller towns. There needs to be a way for Elders to be treated without travelling to larger cities. A public government facility needs to focus on its groups and reach them.

PROBLEM DEFINITION

The lack of specialised care facilities within South Africa is already a problem. I propose designing spaces that respond to the conscious and subconscious needs of intellectual disabilities.

While the Western Cape (Figure 5, Western Cape Stats) has the most centres, 107 centres (85 private and 11 public), The Western Cape Healthcare facilities are more spaced around the entire province, almost ensuring the transport to each centre is more spaced apart. The problem I find is that majority of the centres in the western cape are private centres, and the cost to use these spaces is higher than in public centres.

While the Free State also has more private centres in the city, Bloemfontein, the public and non-profit centres are located in some other towns. This would work better if these services could be adapted to the healthcare facilities in all the towns. The smaller towns do not have a workforce as large as cities, but they do carry specific functions. For example, a farming town should have medical services for staff regarding their injuries caught on site and intellectual and psychological issues that they might face. Having these spaces to meet the needs of the communities works as well. Spaces of townships in smaller towns are still growing despite the motivation to move to cities, and intellectual disabilities are not identified and mapped in these communities.

DESIGN QUESTIONS (PROBLEM)

How do we design spaces that respond to the conscious and subconscious needs of Alzheimer's & Dementia patients?
What architectural spaces need to be considered to create safe environmental spaces?
How will the design preserve the quality of life while keeping the patient's freedom?
How to design spaces that use the human senses?
What are the spaces elderly patients need?
Can we design spaces to fit multiple environments?

WORKING HYPOTHESIS

Studies are showing the benefits of light (Steffy 2002), and open spaces (Hashemnezhad, Heidari and Hoseini 2012) will create a more favourable environment for Alzheimer's and Dementia patients (Lundin, Healing Architecture: Evidence, Intuition, Dialogue 2015).

Spatial planning in more micro spaces can be designed to fit, especially with limited resources.
Biophilic Design can create less stressful healthcare facilities.

I propose that using architectural design techniques and appropriate building materials can help with designing spaces ideal for patients with Dementia and Alzheimers.

OBJECTIVES

The broader objective would be to give more specific spatial needs for Alzheimer's and Dementia patients, whether living independently, with family, or with living health workers. I am proposing specific building guidelines regarding healthcare facilities with conditions similar to Alzheimer's and Dementia patients. I will propose spaces for their staff. The research will involve no human participation. My research will only use secondary data taken from Journals, books, and reports addressing health care design, care for elderly patients, and facilities for Alzheimer's and Dementia patients.

METHODOLOGY

Research through design (designing for specific solutions) is a combination of inductive reasoning, integrated design process, and evidence-based design, interpretation, and imagination linked to various types of health care facilities, constraints (such as technological considerations, building sites, client, and user groups), and precedents (urban and architectural). The creative research process will take the information obtained from the research and find a way to identify them about. The research combines qualitative and quantitative approaches to knowledge and argumentation, whilst the creative component translates into a defensible architectural proposition. My research will only use secondary data addressing health care design, care for elderly patients, and facilities for Alzheimer's and Dementia patients.

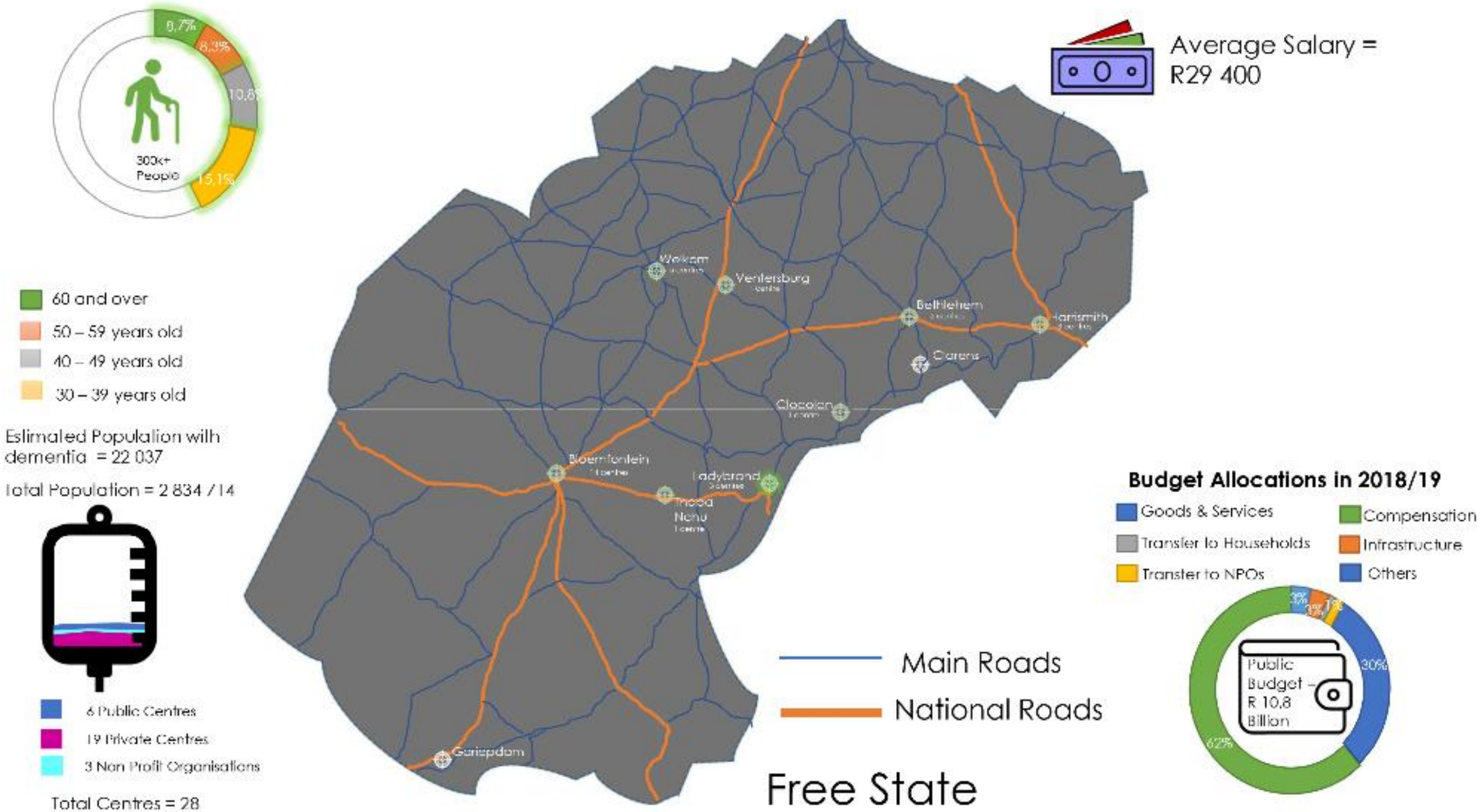


Figure 4 Free State Stats

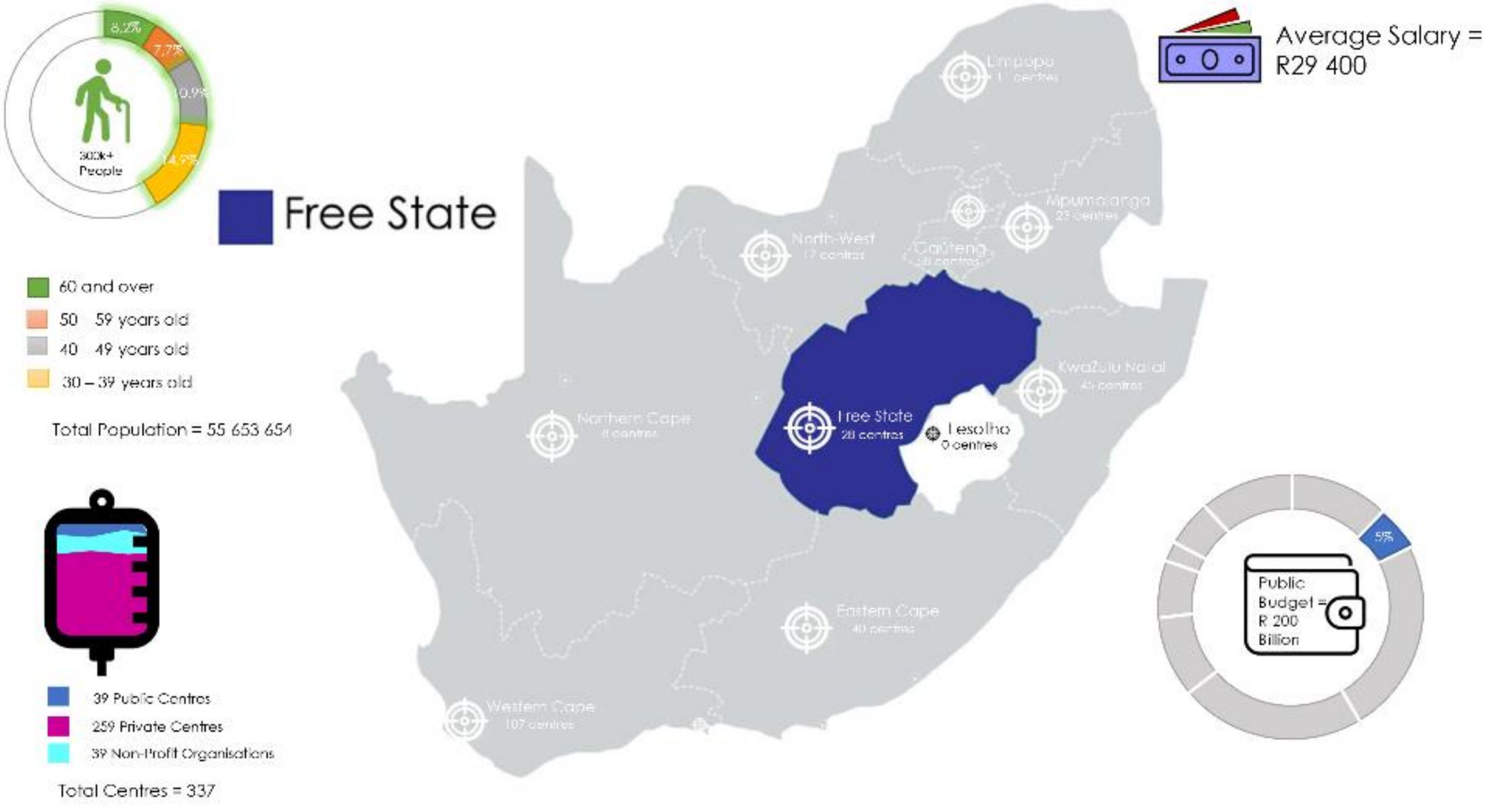


Figure 5 South African Health Facilities Stats

The Clinic

For this section I look at the type of healthcare facilities available and propose which should be added into the design to join the part of the research. I start looking at Private and Private clinics, Health centres, physiotherapy spaces and mobile clinics.

A clinic can cover medical teaching centres, hospitals, and even outpatient (patients that do not require to stay overnight for their treatment) facilities. A clinic "is an organised medical service offering diagnostic, therapeutic, or preventive outpatient services". (Brown, Skone and Scarborough 2020). It is optional for a clinic to be connected to a hospital. (Expectica 2021)

Hospitals are generally have larger spaces for patients to stay (Figure 5). While clinics are smaller in size, as more hospitals are in cities, Health clinics are usually found in smaller towns and villages. In figure 8, I have shown the list of public hospitals as identified by the Department of Health. To understand the differences between the program, we must understand the types of clinics to be used or understood. The types of clinics for the research, a look into public health facilities, different types of clinics, and physiotherapy studios.

PUBLIC HEALTH CLINIC

Specified public health clinics usually focus on one or multiple medical interests under one specific medical group. These could be, for example, HIV /Aids care, tuberculosis, mental health, covid testing, or vaccine distribution. The benefit of public health clinics is to support the community. More public clinics are used in public buildings or housed by social agencies. 86% of public health centres receive financial support from the government (Health Policy Project 2015). At the same time, the rest are from private companies & individuals (donations) and other social agencies.

PRIVATE CLINICS

A private clinic is a medical facility operating in the private sector (not expecting funds from the government). The clinics are operated by individual doctors or a board of individuals (Brand South Africa 2012). These clinics will also use administration and medical facilities as public officials. These clinics can have a voluntary association of physicians agreeing on how the clinic needs to be run (Poole and Theilen 2013). There are private clinics that focus on a specific medical field. Some private clinics do offer prepaid health service plans or become covered by medical aid plans. Private clinics do work, but the costs are usually too high for most of the population, with 16% of the population using private health schemes (Brand South Africa 2012). The cost of consultations of private consultations, R350 – R400, to state R55 (Expectica 2021) is an example of the difference in prices.

A private wing would operate well for the rest of the citizens in the small-town area. This will allow the entire town to gain access to the clinic.

HEALTH CENTRES

Health centres provide health services (preventative care, counselling, therapy, and even surgical). Health care centres provide general medical services, dental services, pharmaceuticals, hospital outpatient, and health education.

Health centres provide care for elderly patients. Many retirement homes have centres located within their area. The centres may not offer complete services like hospitals, but they have spaces more dedicated to serving patients as a clinic. There are other types of centres, but I am building a clinic focusing on elderly citizens for this project.

PHYSIOTHERAPY STUDIO

Physiotherapy is the treatment for physical injuries or diseases. Physiotherapists aim to improve patients' quality of life by using different physical treatments to alleviate pain and restore function. The designing of physio centres encompasses spaces that allow machines to layout and enough space for patients and physiotherapists to work together.

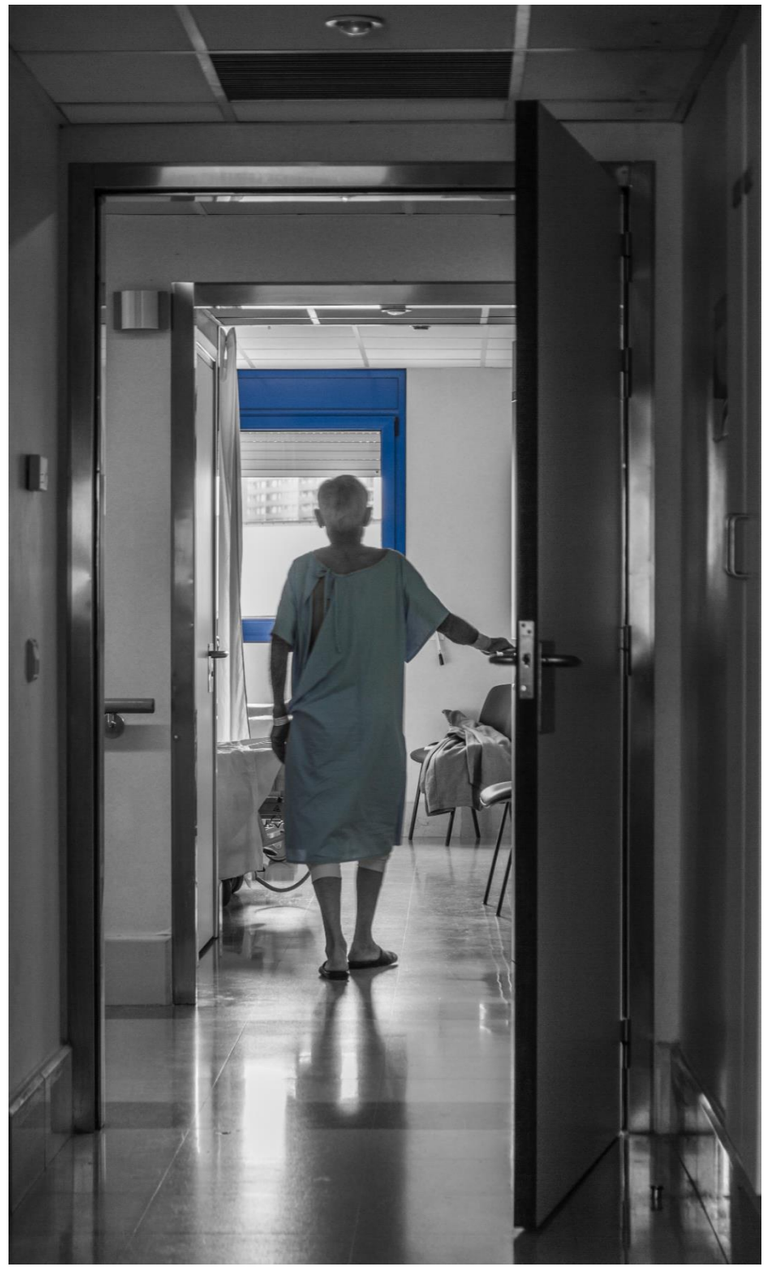


Figure 6 A picture of an elderly patient by Isaac Quesada

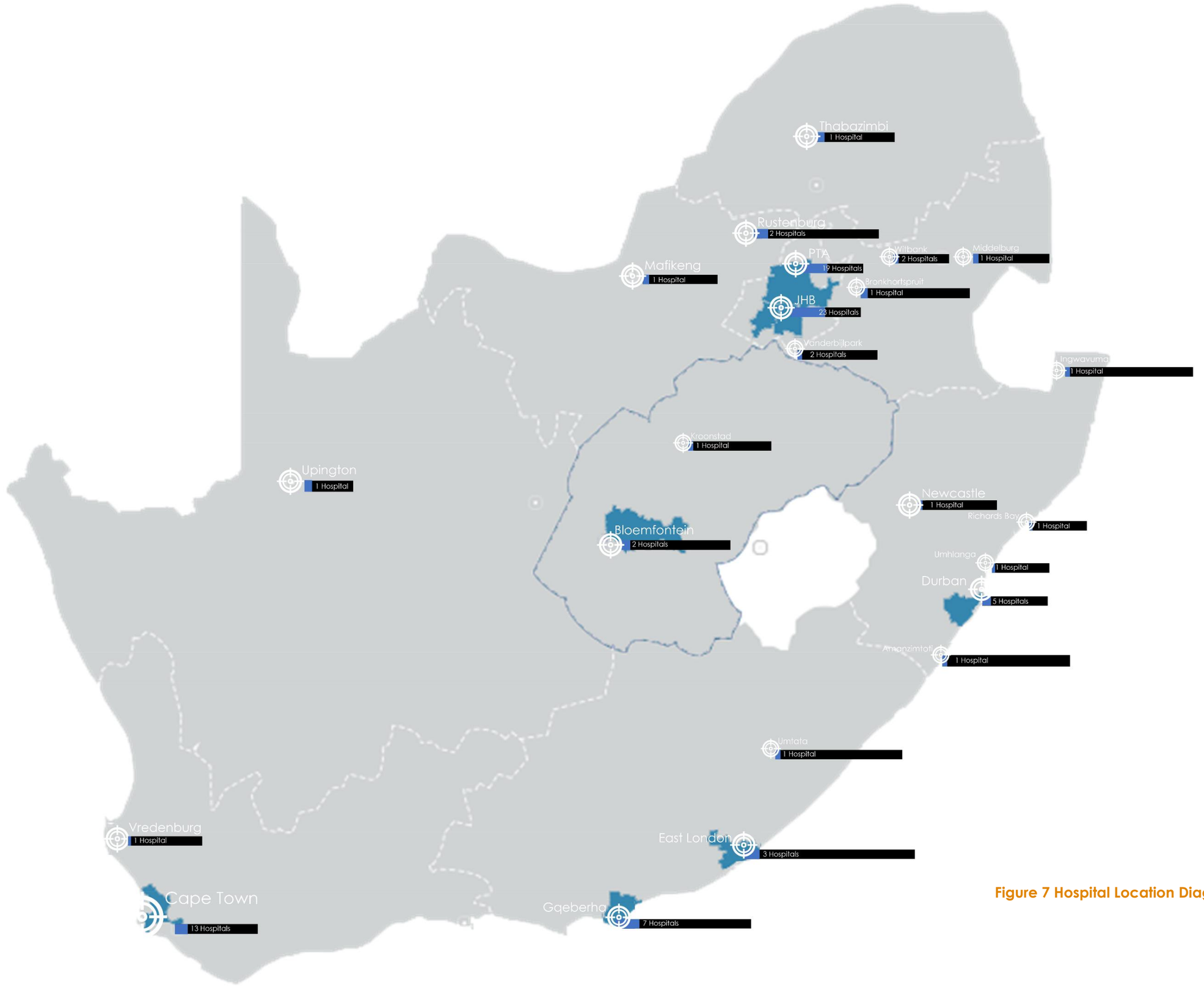


Figure 7 Hospital Location Diagram



Figure 10 Provincial Medical Vehicle by TFM (https://www.tfm.co.za/portfolio-item/tfm-city-of-johannesburg-ambulances-toyota-quantum/



Figure 9 Internal Hospital car design by tfm (https://www.tfm.co.za/portfolio-item/tfm-city-of-johannesburg-ambulances-toyota-quantum/



Figure 8 (George and Raver, Station 19 - No Days Off 2020)

Issues through exercise, massage manipulation and other treatments instead of surgery and medication.

POLYCLINICS

In Russia, the polyclinic (poliklinika) was made to combine an outpatient hospital department with a health centre. The premise was for factory workers and their families could visit the clinics close to factories and many unique children's polyclinics in towns. In Russia, typical urban polyclinics related to hospitals had programs including reception areas, waiting rooms, registration desks, and consulting and treatment rooms. Depending on the need, there would be specialists such as neurologists, dentists and certain specialists. In the building, some programs needed to include first aid, an infectious ward, women's and children's welfare, drugstores, pathological labs, physiotherapy departments, gymnasiums, lecture halls and even large and small operating theatres. The benefits of these clinics are that although they were privately funded, they ensured the community workforce was medically taken care of against diseases that could come from factory work. There are also the benefits of making clinics by private companies taking care of the communities and their workforce, for example, taking care of their mining care.

MOBILE CLINICS

Mobile Clinics are healthcare facilities that can reach communities that live in areas with little infrastructure. These could be old towns, townships, informal settlements, or rural areas. The mobile portion of the clinic is mainly vehicle-based. This could be a large van, minibus, pickup truck, or recreational vehicle. To be clear, a mobile clinic will not be another ambulance vehicle. This vehicle will allow healthcare officials to work with more equipment at their disposal, a bit more space and with our space planning more compartmentalised spaces to better use the space. The closest real-life example used in the Season 3 Episode 11 episode of Station 19, where they show the interiors of the design.

The convenience of these vehicles is the allowance of healthcare for every citizen, regardless of location. The goal

for mobile clinics is to maximise usage with the minimal space a vehicle offers.

The final design will not be a mobile. I just wanted to emphasise the need for a mobile station for remote locations.

THE PROJECT

In this project, the proposal is for a public adult day care centre with a clinic, with a clinic and living units for the staff. The centre is designed to care for, support and protect elderly citizens.

Components

This Dementia Care Centre will have these core elements

- A public clinic
- A consultation building
- A physio building
- A staff building
- A Mobile Clinic

A CLINIC

I propose a clinic to serve the community. It will serve to help the community by focusing mainly on intellectual disabilities.

A CONSULTATION BUILDING

A consultation building will help by offering private consultations for the community. This will allow private consults close to the clinic and the physio building. The consult building can serve members of the community with intellectual disabilities.

A PHYSIO BUILDING

A physio building would be beneficial for the clinic as this would offer a service to help elderly citizens with physical injuries and help community members with physical injuries.

STAFF BUILDING

I propose a staff building as a space close to the clinic, consultation building, physio building and mobile clinic. I propose the building be a private building only intended for staff to take a break, eat, shower, and prepare for their shift or leave. The staff is meant to be a peaceful breakaway space from the hard work they perform.

MOBILE CLINIC

Mobile clinics are an excellent add-on for public facilities. Both private and public hospitals have medical vehicles that paramedics have access to modified with healthcare services for car crashes or to pick up sick or injured patients.

The use is already available with both private and public healthcare.

I propose a mobile clinic to be able to reach members of the community further away from the location. This would be on a farm or a township.

Care in a clinic

When designing healthcare facilities, the main priority is the well-being of the residents (Reiling, Hughes and Murphy 2008). Residents include patients, visitors and staff. A space where the staff feel motivated and patients feel calm and cared for. The architecture of the environment needs to develop a healing environment. In this chapter, I look at general healthcare facilities. The methods of designing healthcare facilities, the layers of complexity, materiality, biophilic goals, privacy and support, noise reduction, prevention for germs spreading, calm and comfort in the building to find out how to design to generate care in a clinic.

IS THERE A FORMULA FOR HEALTHCARE DESIGN?

Healthcare facilities are generally complicated designs and are home to groups of professionals with strict healthcare regulations. In the design process, many professionals need to join. The project needs to have a clear goal: treat patients and get them to go home as soon as possible. With elderly patients, the goal is to give them a space to receive health services and be as healthy and fit as possible. When we design the program architecturally, these are the questions I found asking myself

- How ample is each space?
- How many rooms does the clinic need?
- What is the primary function of the clinic?
- What are the adjacencies needed by each room or group of rooms?
- What spaces need a heavy level of security?

These questions will be asked during the design and space planning for the building. My research is going to answer these questions using various sources in my research to agree with the current standards used currently such as the SANS 10400.

I will be referring to the SANS 10400 as a reference because spaces have to comply with the rules in most sections unless a rational design is used. I will use these rules and look at them against general considerations I have found in my research. The intention is not to disprove the SANS 10400 but instead to understand why not design to the space as a minimum.

As a part of looking at different terms, I have considered well-being and its direct Sotho translation, the term of Boiketlo. A look at green architecture and certifications in South Africa and other countries, neuroarchitecture.

HISTORY OF HEALTHCARE

In the 20th century, there were a series of wars and pandemics throughout the world. There were different cases of influenza (Kilbourne 2006) and TB and wars of genocide (Stephen 2020) throughout the continent. During this time, namely during the TB outbreak, bacteria accumulated in dusty areas (Kilbourne 2006). These goals design possibilities in ventilation, sunlight, and dark and damp spaces.

The goals are to design easy-to-clean surfaces, for example, ceramic tiles, to prevent the accumulation of bacteria. Princeton architectural theorist Beatriz Colomina had a theory in 2019 that modern architecture was a form of a medical system to combat the health problems that concerned society. I believe she is correct because I believe, especially in the 20th century was not seen as a major health concern from the viewpoint of elected officials or people with financial gains.

The book X-Ray architecture (Colomina 2019) shows a substantial similarity between an X-Ray (a digital image of the internal composition of a person's body) and sections and a plan of a building. There is a strong connection when we look at a section and remove the "flesh" in the context to understand how the structure works. I believe the X-Ray of the Architecture works even better because it gives a detailed look at all the layers of the "flesh" by the flesh, I mean the materials surrounding the structure, and give a more detailed look at when the space will look and feel like. I see the X-Ray in Architecture as how shopfront glasswork in a dealership or fashion store gives a taste of what happens inside.

In Paul Scheerbart's Glass Architecture (written in 1914), the writer makes a tribute to the effect Glass has on Architecture. Paul blames heavy materials such as Bricks for accumulating dust and for the research blames the heavy materials for the disease people face. I find Glass Architecture as a strong book the compliments X-Ray Architecture. In the previous paragraph I mentioned how glass gave an x-ray into showrooms, glass architecture identified that removes privacy in s space. Whether being a

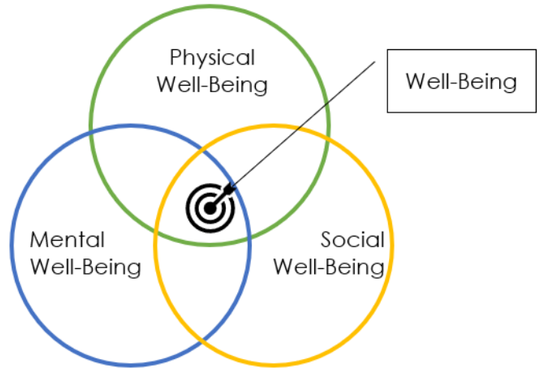


Figure 11 Well-Being diagram

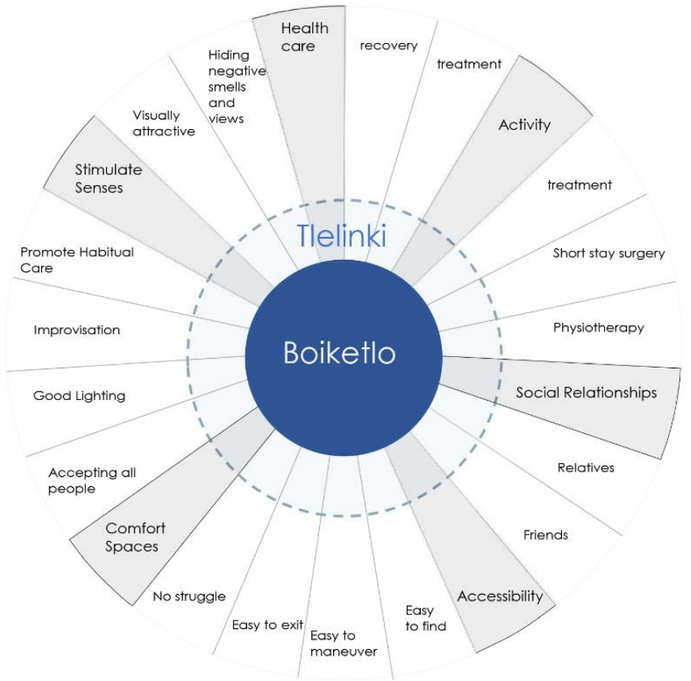


Figure 12 Boiketlo Diagram

curtain wall or a window, the glass creates a viewport inside the building.

Glass Architecture identified that in the 19th century identified as were sanatoriums. The sanatoriums focused on middle-class groups in Western countries had long healing seasons. The fascinations with these types of buildings were that homes should follow healthcare facilities. The belief was that being surrounded by a natural environment and taking sun baths with good air ventilation could cure disease.

WELL-BEING AND BOIKETLO

When designing healthcare facilities, we need to consider the building users' habitus. Habitus represents the characteristics of the individual and needs to be considered. In a manner, habitus asks the designer to consider the users' mental, personal and physical conditions.

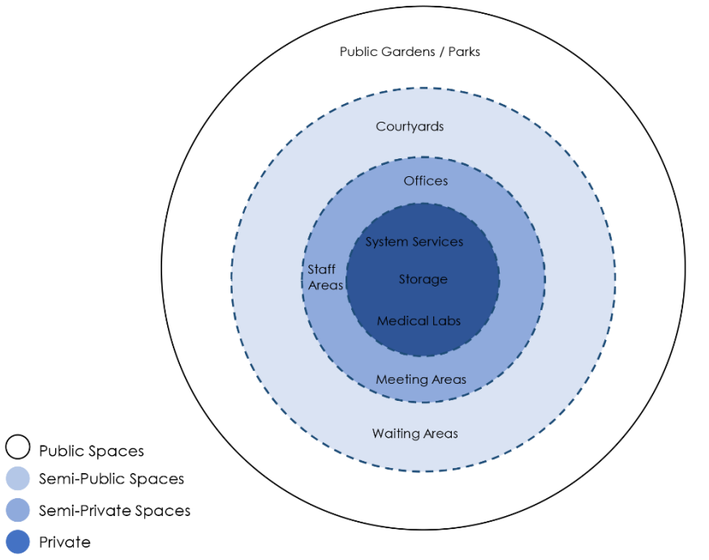


Figure 13 Well Being Diagram

SICK BUILDING SYNDROME

Various studies warn us that the air we breathe inside, where we spend most of our hours, is up to six times more polluted than the outside air.

In 1983 the World Health Organisation (WHO) called the sick building syndrome. "Sick Building Syndrome (SBS) describes a medical condition where people in a building suffer from symptoms of illness or feel unwell for no apparent reason. The symptoms tend to increase in severity with the time people spend in the building and improve over time or even disappear when people are away from the building. Sick Building Syndrome results in substantial disruption of people's work performance and personal relationships, and considerable loss of productivity." (World Health Organization Regional Office for Europe 1983). The original report is intended for offices, but I believe the report is applied to public hospitals in sub-Saharan Africa.

The report believed that some of the causes of sick buildings are:

- The lack of ventilation
- Poor air quality
- A higher concentration of CO_2 or toxic particles *(this was a worry for me regarding disposing of medical waste)*
- Bad odour/smells
- Avoid building on tremors or fault lines.
- Loud noises (large vehicles, construction work etc.)
- Bad lighting

The report also identified the possible symptoms

- Asthma
- Activation of allergies
- Tiredness / Chronic fatigue
- Isolation
- Cardiovascular problems (i.e. ischemic heart or myocardial infarction)
- Poor work performance
- Depression

Some points to be aware of are notable in the green star and LEEDs certifications. Figure 16, it displays the categories that LEED-certified buildings will receive. Specifically, I want to focus on Indoor Environmental Quality. The category gives the requirement for indoor and environmental quality that needs to be obtained in a LEED-certified building.

South Africas Green Building Council has a similar system in the net zero building (Figure 16) also gives the factors that need to be considered when considering natural ventilation (Green Building Council South Africa 2020). Various documents have been issued regarding the use of natural ventilation, and even SANS provides documentation on minimum openings. My only reservation is not discussing a minimum opening regarding the building classification.



Figure 14 LEED Credit Categories from https://greenbuildconcepts.com/gbcc/

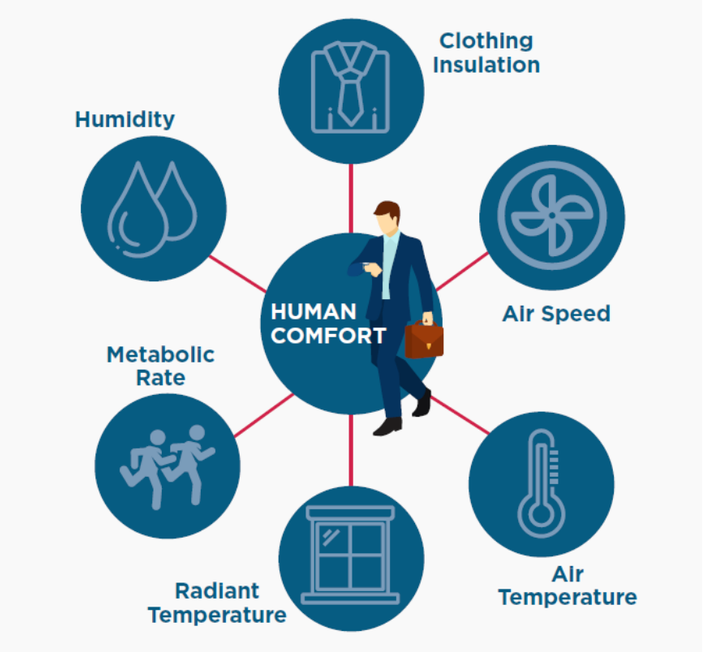


Figure 15 Humidity Diagram from GBSA Net Zero Book

The SANS 10400 Part A and Part O look at building classifications linked to healthcare facilities. Part A (Figure 17)

1	2
Class of occupancy of building	**Occupancy**
E4	**Health care** Occupancy which is a common place of long term or transient living for a number of unrelated persons consisting of a single unit on its own site who, due to varying degrees of incapacity, are provided with personal care services or are undergoing medical treatment.
F1	**Large shop** Occupancy where merchandise is displayed and offered for sale to the public and the floor area exceeds 250 m^2.
F2	**Small shop** Occupancy where merchandise is displayed and offered for sale to the public and the floor area does not exceed 250 m^2.
F3	**Wholesalers' store** Occupancy where goods are displayed and stored and where only a limited selected group of persons is present at any one time.
G1	**Offices** Occupancy comprising offices, banks, consulting rooms and other similar usage.
H1	**Hotel** Occupancy where persons rent furnished rooms, not being dwelling units.
H2	**Dormitory** Occupancy where groups of people are accommodated in one room.
H3	**Domestic residence** Occupancy consisting of two or more dwelling units on a single site.
H4	**Dwelling house** Occupancy consisting of a dwelling unit on its own site, including a garage and other domestic outbuildings, if any.
H5	**Hospitality** Occupancy where unrelated persons rent furnished rooms on a transient basis within a dwelling house or domestic residence with sleeping accommodation for not more than 16 persons within a dwelling unit.
J1	**High risk storage** Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.
J2	**Moderate risk storage** Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.
J3	**Low risk storage** Occupancy where the material stored does not fall into the high or moderate risk category.
J4	**Parking garage** Occupancy used for storing or parking of more than 10 motor vehicles.

Figure 16 SANS 10400 PART A Table 1 from SANS 10400

gives the classification of the building and, in some instances and in Part O Table 2 (Figure 19) shows the needed ventilation needs in certain spaces.

SANS 10400 doees not disregard in terms of the need for natural ventilation, I would have preferred if the need for some spaces needed to be left for natural ventilation should be left to the discretion for the Architectural designer / technician.

In public spaces as designers we look into the addition of natural ventilation and if we can cross ventilation in certain spaces. Especially in SANS 10400, Part A, the minimum amount of space per person is given, we take those as minimums and try our best to design the best use for the spaces we are given. Architects manage to takeall of our consultant's work and design to fit into the space. Architects understand each consultant, and as we understand

Table 2 (*continued*)

1	2	3	4
Type of occupancy	**Minimum outdoor air requirements**		**Requirement**
	Air changes per hour	**L/s per person**	
Motor car repairs	30	10,0	Air supply required per square metre of floor area
Ticket kiosks	2	5	Air supply required per person with required minimum air changes per hour
Health care facilities			
Surgical and critical care:			
Operating theatres and suites	20	–	Pressure relative to adjacent area shall be positive
Wound intensive care (burns)	6	–	Pressure relative to adjacent area shall be positive
Critical and intensive care, treatment and delivery rooms	6	–	Pressure relative to adjacent area shall be positive
Trauma, ER waiting rooms, radiology waiting rooms and triage	12	–	Pressure relative to adjacent area shall be negative
Diagnostic and treatment areas:			
Bronchoscopy, sputum collection, examination room and treatment room (general)	12	–	Pressure relative to adjacent area shall be negative
Medication room	4	–	Pressure relative to adjacent area shall be negative
Physical therapy and hydrotheraphy	6	–	Pressure relative to adjacent area shall be negative
Inpatient nursing areas:			
General wards, paediatric wards and labour/delivery/recovery/postpartum rooms	2	–	Pressure relative to adjacent area shall be negative
Airborne infection/protective environment wards and anterooms or airlocks	12	–	Pressure relative to adjacent area shall be negative
Laboratories			
Microbiological (molecular)	6	–	Pressure relative to adjacent area shall be positive
Bacteriological P1	6	–	Pressure relative to adjacent area shall be negative
Bacteriological P2, P3 and P4	12	–	Pressure relative to adjacent area shall be negative
General biochemistry, cytology, histology, nuclear medicine, pathology and serology	6	–	Pressure relative to adjacent area shall be negative
Radiology			
General radiology areas	6	–	Pressure relative to adjacent area shall be negative

Figure 17 SANS 10400 Part O Table 2 from SANS 10400

ventilation and mechanical requirements we should be able to give natural ventilation.

BOIKETLO

The term Boiketlo means to let things happen quickly and also means leisure. The term with the research will mean making sure the design needs to make the experience have peaceful leisure (Figure 9). I propose making a space peaceful for staff and patients and easy to travel through. I must consider Comfort, Accessibility, and The activities within the space. The spaces can stimulate the senses of the user.

HEALTH CARE SPACES

Spaces in healthcare, namely spaces for recovery and treatment rooms, should be designed to be stimulating and peaceful. The spaces can be found to cause stress to the patient. The spaces should also be able to have enough space for their equipment. Hospital equipment is a piece of essential equipment, and this is why space planning would need to be organised to be able to place equipment, extensive equipment such as stretchers,

ACCESSIBILITY

Accessibility is an essential factor to consider in the design. The design needs to incorporate factors to be easy for users.



Figure 18 Accessibility digram

The users' access should not be complicated regarding location and wayfinding in the building. Long driveways or passageways with many turns would make finding the site, the clinic, and the correct rooms should be easy to find and have simple routes. Appropriate signage around would also to be able to find the site, to help to be able to navigate around the site.

SOCIAL RELATIONSHIPS

Social relationships can be influenced by the layout and form of the building. Conversation between staff, patients and their support is a positive tool for patient well-being, and the design needs to promote this activity. The goals for public and private areas need to be defined.

With visual contact, common areas should be placed close to the private spaces. Long hallways with no visual direction can be a mental barrier for patients and staff.

Waiting areas should be decorated with different types of seating arrangements to be visually stimulating, allowing people to sit alone or sit as groups. This allows different people to engage with the space in a positive manner.

THE FORMULA FOR DESIGN

Most clients have specific needs, but many healthcare designs share spaces that circulate specific spaces to link together. For example, the help desk, the pharmacy and the causalities departments are usually grouped close to the main hospital entrance so patients and visitors can enter. This prevents patients from entering more private spaces like medical labs and system services. This organisation of spaces quickly and efficiently without wandering in the hospital.

System services like waste management, medical supplies and laundry are preferred on the ground floor and situated at the back of the building. This is done so that everything functions smoothly without interfering with the day-to-day activities of the clinics.

LAYERS OF COMPLEXITY

During the design process, like designing on bumf, layers of data are laid into the design. These are the structure, mechanical ventilation, lighting, wet services, medical equipment, landscape equipment, mechanical services, electrical services, acoustic decibel requirements, financial limitations, landscape designers, specialist equipment providers, interior designers, health and safety consultants and building services.

MATERIAL SELECTION

In Africa, the budget for infrastructure projects is known to be tight. However, the overtime budget may even be reduced (National Treasury of the Republic of South Africa 2021). This requires architects to think on their feet, meaning creating lovely, excellent and healthy architecture despite the financial and conflicting challenges. The architecture has a clear mission to uplift and heal its users. Good healthcare architecture should involve calming a calm and inviting form. However, it must take every opportunity to make people experience architecture. These include passive environmental design, sustainability, functionality, economy, landscape design and biophilic design.

Healthcare facilities must be clean, modern, efficient and inviting in as many ways as possible. When selecting interior and exterior materials, one must remember that the end goal is to give its users an uplifting and healing environment.

ENVIRONMENTAL CONSIDERATIONS

Looking at sustainability reminds us that we need to minimise the carbon footprint of new buildings. Linking to the previous section requires thinking of materials that are not harmful to the environment. The materials needed should not be too far away. Architects need to design with the lifecycle of the building in mind and be practical regarding the maintenance of the building. The people living in the area should be able to maintain the buildings.

THEORETICAL DETAILS

We should also consider. Dirk du Preez, project architect at Graceland Architects, identifies Salutogentic and evidence-based design as exciting fields. Thea Grunfeld and Anne Arildsen Vansgaard support evidence base design and integrated design processes. These theoretical tools have extensive research regarding effects on patient recovery.

The salutogenic design was developed by Aaron Antonovk, an America-Israeli professor of medical sociology. The salutogenic design focuses on wellness factors and elements that promote healthy well-being.

Evidence-Based Design (EBD) is developing a design based on research to achieve the best possible (Lawson 2005). EBD contains different types of design processes that outcomes have significant positive effects on most patient groups. This reminds us that the design must meet the needs of the patients and the staff, creating more benefits for the patients.

Integrated Design Process (IDP) is a method for realising high-performance buildings that contribute to sustainable communities (Lawson 2005). This process focuses on the design, construction, operation and occupancy of a building over the complete cycle.

INTERIOR EXTERNAL SPACES

Natural light is one of the biggest influences on a patient's health. Putting natural elements inside the building creates a calming effect. Courtyards and gardens are critical elements in healthcare facilities. The goal is to put these spaces in as many places as possible.

This becomes a complicated tool because, firstly, the cost of these elements is expensive. Secondly, as designers, we cannot just put natural elements in a healthcare facility. We must abide by healthcare regulations, and we need to remember that certain vegetative elements invite wildlife. This is where Biophilic and Biomimicry work incredibly well. If we cannot put nature in specific spaces, we can design spaces that remind us of nature. This can be done by considering natural materials and patterns.

PRIVACY

Privacy is a critical factor for healthcare facilities. According to Du Preez, privacy is necessary for the inpatient experience (Building & Decor. 2016). The current idea is to deal with fewer beds in a medical ward. In the perfect world, medical recovery spaces would be single rooms. However, this needs architects to think out of the box and possibly develop more space planning requirements with the financial burdens.

Have appropriate furniture for the environment. Provisions need to be made regarding family support in terms of comfortable and calm waiting areas. We must also beware that waiting areas need to accommodate and be inviting for children and their parents.

The transition spaces need to be designed well, and the feeling of institutional spaces needs to be avoided. Using colours and materiality would be beneficial in this manner. Adding plantage or biophilic design elements in the spaces removes the institutional feeling in the design. In designing spaces, long naked corridors should be avoided. Signage and colours would be beneficial in this space. The visual dominance of medical equipment removes the calming effect on the patients. If possible, designs need to be placed to convert appropriately.

LOCALITY

The location of healthcare facilities significantly affects the group of users that enter the building. Healthcare facilities need to be located closer to the town centre, population,

and transport services. Distancing from population and transport services will create empty and dead spaces.

FLEXIBILITY

When designing a healthcare facility, we must remember that we are designing for unpredictable situations. Flexibility is critical in healthcare design because we are attempting to design for the users' different mental and physical needs.

SOUND CONTROL

Sound control is an essential factor when dealing with healthcare facilities. There are a broad group of people interacting with the spaces. Connecting to space, we need to limit the travel of sound. This requires the designer to choose suitable materials with a good decibel range and extend walls above the ceiling height.

GERM PREVENTION

Frequent handwashing and sanitising in more spaces is the most effective way to keep germs from spreading. Enough basins, and sanitising stations, positioned throughout the hospital, possible in every space, are vital considerations in healthcare design.

Homogeneous materials that are waterproof and easy to clean would be ideal choices.

TRANQUILLITY

Healthcare facilities need to be attractive and not threaten the users of the building. The majority of staff spend their time indoors. Du Preez (Building & Decor. 2016). The advice using calm and neutral colours. An understanding of colour psychology helps. Colour psychology is the idea that colours are connected to people's moods. Colours will be discussed late.

When designing, there should be apparent differences between horizontal and vertical elements. This will make it easier for people to orient themselves, especially when they are unsteady, nauseous, or suffering from different conditions. Du Preez (Building & Decor. 2016). They recommend using less shiny floor materials. Even though they represent a clean feel, they offer a more water effect on the floor.

An indoor climate is a tool used for patients. This is an architecture and mechanical design tool. The correct choice of materials can help reduce the use of mechanical climate apparatus, but it needs to be manually corrected.

When designing healthcare facilities, we need to remember that we are not just building structures. We need to understand the process, functions, technology, and needs of the users to create a design where all the needs are addressed efficiently and well-integrated. Mobile stations would also need to consider the comfort for transport and mobile designs.

The Social Interaction

The people using the centre must be considered to create an appropriate design. In this section, I discuss the people considered and gauge an understanding of the older adults using the facilities, the medical staff and the supportive family.

ELDERLY GROUPS

There are more older adults growing up in South Africa, but the governments in South Africa cannot meet the needs of their people. The elderly group mainly focuses on those 50 years old and above. These older adults face various challenges, such as physical mobility, arthritis and Dementia.

MEDICAL STAFF

Ground staff – usually assigned to be able to maintain the site of the grounds of the clinic. These include keeping grounds, removing weeds, and maintaining the site's furniture and plants.

Facilities staff – responsible for maintaining the building and ensuring the services of the building are all maintained. The facilities staff will need to be able to help with maintaining all buildings and spaces. The staff members also need to help with the mobile clinics to help with setups, especially if new staff members need help with the setup.

Nurses and doctors – these professionals are more professionals that spend more time taking care of their patients. There will need to be professional drivers who need to drive as they will drive medical vehicles.

VISITORS

These are members of the family that need to be considered. These members could be from one to five members of the family or even friends. There are no specific characteristics, but spaces must be allowed for families and patients to sit and wait. It would be an excellent supportive tool for families to seek psychologists or therapists to handle elderly patients.

Common Health Problems linked with Elderly Patients

The following passage focuses on the common issues elderly patients face. There are several other issues faced. However, these are the common issues faced (American College of Cardiology 2021).

BACKGROUND OF DEMENTIA

Dementia is one of the key issues that has pushed in terms of my design for this issue I will give a more detailed understanding of it. Dementia is a mental condition in which the patient suffers from a mental decline. The decline in Dementia is broken down into seven stages.

- **Stage 1 - No cognitive decline**. A patient does not exhibit any cognitive signs and symptoms. There will not be any visible signs for the patient's family, which makes it very easy to ignore. Very hard for any study, scan or analysis to show.
- **Stage 2 - Very mild cognitive decline**. The patient starts forgetting words or misplacing objects. There may be tests that still do not show any signs of Dementia in the body. For families, the justification for memory loss would be associated with ageing, and testing would not be considered.
- **Stage 3 - Mild cognitive decline**. The patient suffers from short-term memory loss—forgetting what they just read and the names of new acquaintances. They cannot make plans or organise things as earlier. From this stage, family members will begin to identify the condition of their loved ones.
- **Stage 4 - Moderate cognitive decline.** A patient starts to lose interest in the things they used to enjoy and avoids meeting people and attending social events. Calculating simple expenses and adding up the financial bills becomes difficult for the patient. The patient also becomes disoriented about time and place—they forget or figure out the present time, date and place. The signs and symptoms of cognitive decline become clear to everyone around the patient. Only at this stage is clinical diagnosis usually made.
- **Stage 5 - Moderately severe cognitive decline.** The patient experiences significant memory disturbances, i.e., forgetting their phone number and address. They may forget how to bathe and face trouble while choosing and wearing clothes.
- **Stage 6 - Severe cognitive decline.** The patient loses their memory as much as they fail to remember the names of close ones and might mistake one person for another. Patients
- also suffer from severe confusion and anxiety. As Dementia worsens, they might need help to go to the bathroom.
- **Stage 7 - Very severe cognitive decline.** This is the final stage of Dementia. The patient becomes utterly dependent on others to carry out basic activities like eating, drinking, walking, and sitting. This stage is crucial to get the patient, a nurse a healthcare worker to help the patient as there is a loss of bladder and bowel control. It is also that their ability to communicate is hampered drastically, as they speak too little, struggling with words.

People diagnosed with Dementia handle situations uniquely. There are several types of Dementia, and the rate of deterioration cannot be measured. Dementia can strike as early as the 30s. The main challenges dementia patients face are disorientation in space, time, and identity.

HEART DISEASE

Heart disease is the most frequent condition in older adults and the No. 1 cause of death. Muscles begin to weaken as well. Heart failure, coronary artery disease, and atrial fibrillation are common reasons for health visits and hospital stays. The best way for elderly citizens to avoid this disease is to keep active. The building's design should be allowed for exercise. (American College of Cardiology 2021) An excellent space to allow for working out is necessary. The goal is to take care of the patient's heart.

VISION OR HEARING LOSS

Age-related eye issues and hearing loss are known issues that elderly patients face. Age-related issues are macular degeneration, cataracts, and glaucoma are common issues connected. A doctor will assess whether to visit a hearing specialist or if you need a cataract operation.

RESPIRATORY DISORDERS

Respiratory diseases such as asthma, cystic fibrosis, emphysema, tuberculosis, pulmonary hypertension, and mesothelioma. The centre should have fields where nurses can test, scan, and diagnose those to scan for these settings. Proper testing and scanning facilities need to be closer to the residents.

ARTHRITIS

Arthritis is the swelling of one or multiple joints. The symptoms are joint pain and stiffness, which usually worsen with age. There is no cure for arthritis, but the treatment works better when identified earlier. The treatment can be medication, physiotherapy, and sometimes surgery can help increase the patient's quality of life. An excellent preventative measure could be exercising.

BALANCE ISSUES

Not a disease but connected with long-term disease. Balance issues are usually inner ear problems. The issue is the patient struggling to control and maintain their body. The result usually ends up falling around. Vertigo and labyrinth are common symptoms. Heart-related diseases, light-headedness, faintness, a floating sensation, blurred vision, confusion, disorientation, or head injuries can cause dizziness. There are multiple causes for balance issues, so there are no definitive solutions. However, if a balance disorder is the main issue, then a rehabilitation specialist is. Building spaces need handrails around especially climbing. (National Institute on Aging 2017)

Designing Clinic

The primary function of clinics is for the well-being of their patient. These factors listed below, in capitals coloured in orange, show the ideal ways to make a more comfortable environment for the patient and a calming space for the staff.

WELL-BEING & HOMELY CARE

When considering elderly patients' well-being, we need to include green spaces and life-enhancing features in the building for this project.

PRIVACY

Privacy needs to be considered as a health facility needs appropriate security for just entering the site and specific spaces.

LOCATION

The site's location should be close to a business district and residential communities. Close to public transport.

The site needs to give an inviting feeling for the psychological feel of the patients, visitors, and staff. The location should preferably have existing natural vegetation on the site.

As light has served as part of my hypothesis, the building needs to maximise the use of natural daylight. The building needs natural daylight, especially in public and patient recovery spaces.

FLEXIBILITY

In the design of the building, the spaces (social spaces, private spaces) need to be designed to fit in multiple spaces.

HEALTHCARE DESIGN

The design of elderly care facilities has significantly developed over the years, giving a chance to focus more on patients with specific conditions. This paper aims to investigate the usage of Architectural design techniques to create healthy, calming environments for patients, visitors, and staff.

The complication of healthcare with advancements in technology for medicine is minimising light entry into spaces. When considering the typologies connected to healthcare design, the designs need to be involved over time, and hospital designs have become more human-centred. These types of facilities now invite Biophilic design, to be discussed later, nature's invitation into the architecture.

Florence Nightingale (1820 – 1910), known as the mother of modern nursing, was a nurse that focused on and inspired innovations in hospital design. She focused on all the physical parameters that affect her patients. She focused on giving patients access to natural lights, air landscapes, and a clean, sanitary environment.

She observed: "Artificial ventilation may be necessary, [but] it never can compensate for the want of the open window . . . Second only to fresh air, however, I should be inclined to rank light in importance for the sick . . . Among the kindred effects of light, I may mention, from experience, as quite perceptible in promoting recovery, the being able to see out of a window, instead of looking against a dead wall; the bright colours of flowers; the being able to read in bed by the light of a window close to the bedhead. It is generally said that the effect is upon the mind. Perhaps so, but it is no less so upon the body on that account."

– Florence Nightingale from Notes on Hospitals, 1863

Florence's comments may be regarding light entry into hospitals. Those comments were not only about memory. Understand the issues patients are facing.

Remove vehicular spaces and become public people spaced. Architect Rick Bell recommended removing parking bays to make more miniature parks. Creating positive sitting environments for patients, visitors, and their families would be beneficial instead of a parking bay. Other offers can offer more walkways, wider paths and more resting positions.

Healthcare works intend to be therapeutic and to reach affordable stages. Biophilic design can work as a critical strategy to ensure therapeutic healthcare is achieved by finding an appropriate style of Architecture.

BIOPHILIC DESIGN

When considering biophilic design, the understanding is first to consider the problems with hospitals. One of the main issues is memory issues currently connected with the current layouts of hospitals. Usually, these layouts do not have a favourable layout.

Investing in preventative care can limit the expenses of medical care, for example, pills and duration of stay in hospitals. With the budgetary constraints of healthcare in South Africa, biophilia can help the public cut down on their medication expenses, as this will help with care. Biophilic elements can also be applied in residential units.

More to be explored in a separate section focused purely on biophilic design.

UNIVERSAL ACCESS

The seven principles of universal design are critical factors in creating ideal products and environments usable by people, to the greatest extent possible, without the need for adaptation or specialised design. The principles have been developed by working architects, product designers, engineers and environmental design researchers. The principles may be applied to guide the design process, evaluate existing infrastructure and Architecture and educate about the characteristics of more usable products and environments. All steps may not be relevant to all the designs but should be investigated to ensure that they do not relate but are cyclic in the design process.

1. Equitable Use – The design is useful and marketable to people with diverse abilities. These may consist of wheelchair persons or patients with less strength. This returns to the curb by lowering it not only applies to people who walk but anyone who may struggle to reach the curb from the road.
2. Flexibility in use – the design must accommodate a wide range of induvial preferences and abilities. The design needs to handle a wide range of preferences as a connection to fair use.
3. Intuitive and straightforward to use – The design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level. Simplicity is a crucial tool in the design, especially for the research project.
4. Perceptible Information – The design needs to communicate necessary information effectively to the user, regardless of ambient conditions on the user's sensory abilities. This would look at key features mainly focused on communicating calming spaces for the patients and all environment users in terms of design.

5. Tolerance for Error – The design minimises hazards and the adverse consequences of accidental or unintended actions. With patients with intellectual disabilities, the degree of error is relatively harder to expect. However, as a designer, there needs to be a way to use the designs to create very few unintended actions. This is a step of great worry but a step that needs to be placed. I believe this step will connect with Flexibility in use.
6. Low physical Effort – The design can be used efficiently and comfortably with minimum fatigue. The design can be used efficiently and comfortably with minimum fatigue.
7. Size and space for approach and use - Appropriate sizes and spaces are provided for approach, reach, manipulation, and use regardless of the user's body size, posture, and mobility. At healthcare designs, we look at recommended sizes.

BROADER CONSIDERATIONS

While looking at universal design principles, the reader must acknowledge that the main challenges are only addressed in the universal useable design. The practice of design involves more than considering useability. The designers must also incorporate other considerations in the design process, i.e., economic, engineering, cultural, gender, environmental, and sustainability concerns. The designers should add universal design access in their design process to address their design.

STIMULATION OF SENSES

The Sensory enhancements to be considered in a design. In working with all 5 (vision, sound, taste, smell, taste, and touch). When designing for elderly citizens, all senses must be considered to help all patients achieve independence and maintain their privacy.

When designing for ageing eyes, we must remember a loss of visual activity in the patient's eyes. There is a lower contrast in sensitivity seen by them. The patient's colour vision is poorer than it used to be. With elderly patients, we must also be aware that their eyes are less spatially aware and have a poorer perception of depth.

Visual stimulation is an essential tool. Elderly citizens, especially in health clinics, spend much time sitting down and observing their surroundings. For private residential units, a good view of the outside should be part of the positioning of the home. In the clinic, views of the correct spaces must be large and clear enough, with appropriate lighting, to be discussed with lighting and biophilic design.

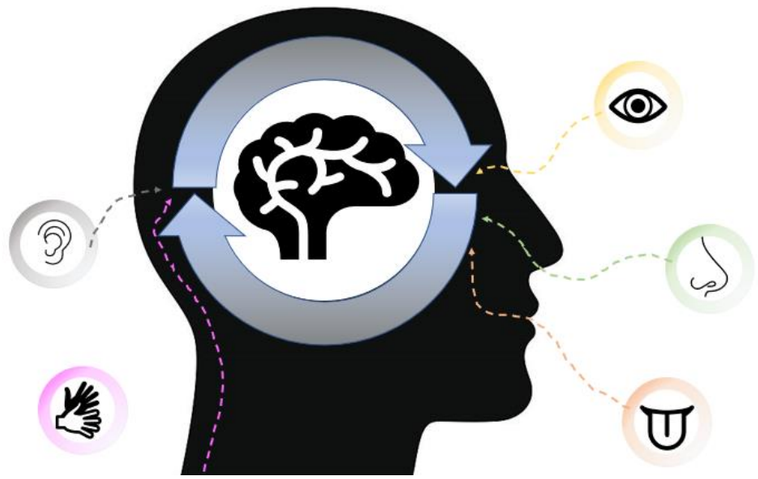


Figure 19 Sensory diagram

Smelling is one of the most prolonged processes, from when the smell enters the nose to when it reaches the patient's brain. In contradiction, once the scent has been obtained, it will last longer than the other senses. The design of smell is an essential step that needs to be considered in designing garden theory

COMFORT

Patients do spend much time indoors; comfort is an essential factor. A factor to investigate would be the interior climate. Interior climate works well as a designer work alongside mechanics, which also needs to be considered.

SOCIAL RELATIONSHIPS

Social relationships are powerfully influenced based by location, size of the project, and the organisation and shape of the building. The number of residents within a centre or home can decrease a patient's loneliness.

GARDEN

Natural elements are a great way to create a calming environment and for people to be able to tell the season, they are in. This will be covered in the next session.

Biophilic Design

When Fred Gage and Yves Christen released "Programmed Cells from Basic Neuroscience to Therapy" (Gage and Christen 2013) emphasised the importance of our environment and nature to our mind. "The human brain is capable of producing new neurons in adulthood, and the environment rich in stimuli may be responsible for it." (Gage and Christen 2013). This is a practice that is a key to why I propose Biophilic design into

"Biophilic design is the deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes – known as biophilia – into the design of the built environment." Stephen Kellert (Kellert 2012).

Biophilic design aims to sustain the productivity, functioning and resilience of natural systems over time. The project must willingly take in natural environmental features, light and spaces and natural shapes and forms.

The idea of Biophilic design comes from a history of human evolution, that 99% of biological organisms evolution is adaptive towards natural instead of artificial or human-forced factors. The human body, mind and senses evolved in a bio-centric (an understanding of the mechanics of the world) environment. Studies show that the connection with nature on human fitness and quality of life (Downton, et al. 2017).

In healthcare, studies have shown that exposure to nature can reduce stress, lower blood pressure, relieve pain, improve illness recovery, increase healing, enhance staff, and improve staff performance. The studies show that nature can reduce staff conflicts among patients (Lawson 2005), (Trøstrup, et al. 2019), (Bowler, et al. 2010), (Cama 2009), (Ulrich 1984), (Downton, et al. 2017), (Lundin, Healing Architecture: Evidence, Intuition, Dialogue 2015).

STEPS AND BENEFITS

The construction of a building can alter the natural system of an area. The designers need to consider the design's short- and long-term effects.

The biophilic design addresses the challenges with buildings and landscapes by setting a new framework for an experience within the built environment. Biophilic Design:

- needs a repeated and committed relationship with nature,
- focuses on human adaptations that have improved people's health, fitness and well-being.
- encourages an emotional connection to locations.
- promotes interactions between people and nature.

The benefits of exposure to nature are dependent on nature's experience repeatedly and development to become functional (Kellert 2012). Biophilic design connects nature with nature. Culture connects

When designing healthcare centres, there are general rules. Hospitals need to be clean and healthy. We know that different spaces offer different functions, and referring to colours that connect with nature, they can develop colours that connect to the right wings. For example, blue and green are natural colours and can help identify specific sections of buildings.

- It is better to select materials with natural textures, wood, stone, and natural fabrics when choosing materials. Although with medical facilities, some regulations and requirements would prohibit certain materials, allowing designers to emulate natural elements.
- Decals on windows, painting on walls and ceilings and shapes of furniture are good examples of alternatives.

APPLICATION OF BIOPHILIC DESIGN

In a space with light, there are experiences. Biophilic there needs to be a consideration of direct exposure (the direct contact with environmental features in the built environment), and indirect exposure (the items which represent nature or the natural environment and the experience of the space and the place.

Biophilic design qualities are experienced through a range of human senses, sight, sound, touch, smell, taste and movement, as discussed with the stimulation of senses.

When designing with Biophilic design, these are the questions to ask in the design development. In my findings, I believe Biophilic design has always existed in Sotho Culture as a historical design (Downton, et al. 2017). In Figure 20, I've given a layout of a Sotho Village. At the same time, the village keeps geometric shapes. Basotho used what the environment could offer in their buildings. The purpose of specific plants in ceremonies, the collection of that and cow dung plasters performed in their homes. More importantly, the gathering spaces were preferred in outdoor environments. This made me see the connection between Basotho culture and the environment. The folklore also connects with the land coming to Basotho's aid. This connection with nature and even the animals the environment feeds got me to believe that Biophilic principles live in

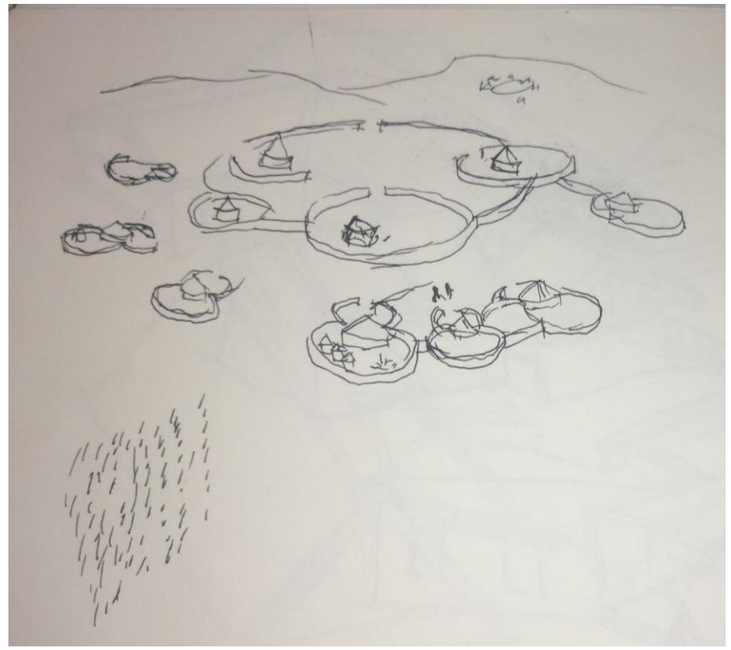


Figure 20 Sketch of an idea of traditional village layout by Kamohelo Motopi

Looking at how traditional spaces gave privacy but used open spaces. The use of plantage in ceremonies, for example, the cactus is cut and placed in water after visiting the grave. In this method, I propose we learn from our predecessors and manage to design to create an inviting

EXPERIENCE OF SPACE AND PLACE examples are:

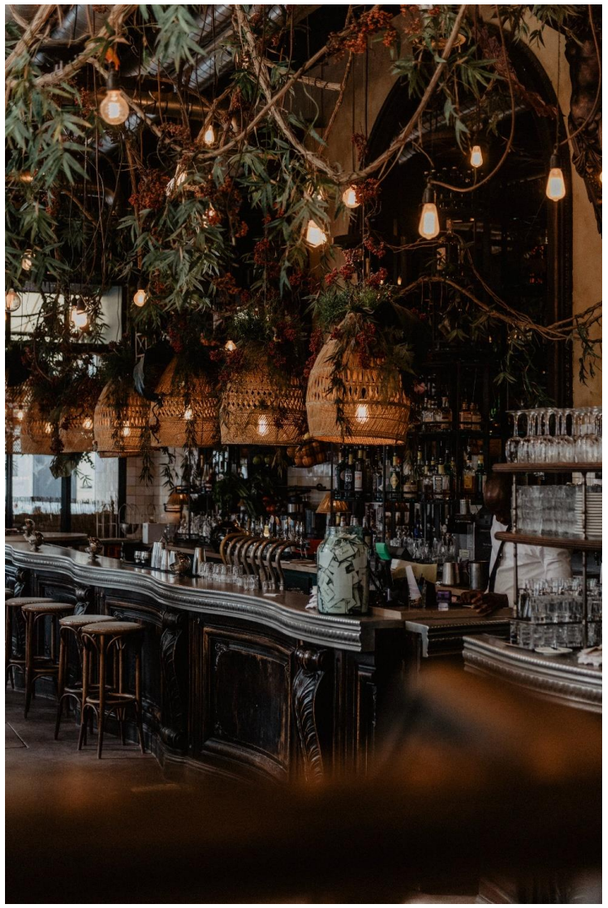


Figure 23 Un café à la française by Thibault Penin in Paris Franc

- Mobility and wayfinding
- Prospect and refuge
- Cultural and ecological connection to the location
- Transitional spaces
- Organised complexity

INDIRECT EXPERIENCE OF NATURE examples are:



Figure 22 Sagrada Church Ceiling taken by Vojtěch Bulant

- Natural materials
- Images of nature
- Natural colours
- Simulating natural light and air
- Naturalistic shapes and forms
- Bringing forth nature
- Natural geometries
- Biomimicry
- Material development with space and time
- Information Update

DIRECT EXPERIENCE OF NATURE examples are

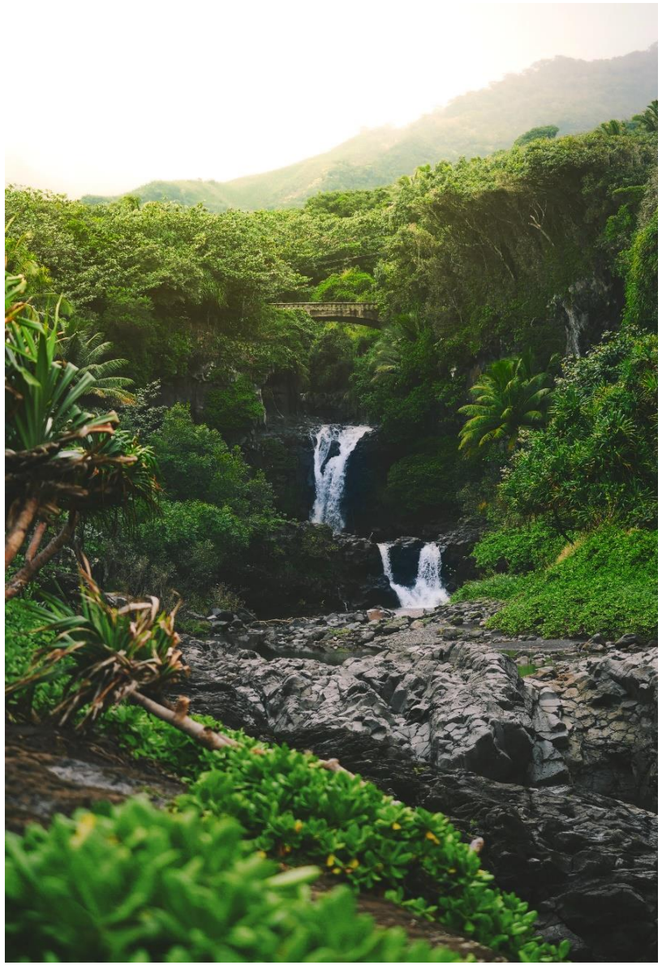


Figure 21 Nature shot by Nathan Ziemanski

- Light
- Air
- Water
- Plantage
- Wildlife
- Weather
- Natural Landscapes & Ecosystems

environment. These comments got me to ask the following questions:

- Does the biophilic intervention enhance any of the characteristics and or features of the natural environment?
- Does the biophilic intervention develop a design or designs that stimulate the users' senses?
- Can we ensure access to nature
- Does the design increate direct exposure with nature
- Does the design elaborate the connection between the building and site, highlighting its characteristics?
- Can the design provide diversity that is contained in nature?

Garden

When looking at the theory of landscapes, subjective factors can affect human emotions. The design of landscapes should be able to emulate nature. When we are working with nature, we need to gain an understanding of natural laws. The garden archetypes need to be understood and elaborated when designing the landscape appropriately. The built landscape is composed of a much larger sphere.

When Fred Gage and Yves Christen released "Programmed Cells from Basic Neuroscience to Therapy" emphasised the importance of our environment and nature to our mind. "The human brain is capable of producing new neurons in adulthood, and the environment rich in stimuli may be responsible for it." (Gage and Christen 2013). This statement is essential for the therapeutic power nature has on the mind, mainly because the myth was as adults, we lose neurons.

"It is a well-known understanding that being in nature affects the human health positively – physically as well as psychologically." (Bahn et al., 2005).

More's theory states, "While nature may hide behind a veil of disorder, upon inspection she is quite regular in her methods: "under her guise of disorders, she veils the most useful views" as views should be a good space. When considering gardening, you need to look at the types of planting being used (Morel 2019). Planters considered

THE BENEFITS OF GARDENS

Reading Roger Ulrichs Health Benefits of Gardens in Hospitals (Ulrich 1984) gave different perspectives regarding the benefits of gardens around healthcare facilities for patients and staff. I found in the research that Gardens have been found to reduce stress and increase satisfaction for all patients and staff. Ulrich has suggested that the natural elements outside (flowers, water, trees and grass) are part of the positive effect (Ulrich 1984). Where I believe I disagree with Ulrich are his beliefs in the built form (concrete or heavy form). I firmly believe that light frame forms complimenting the environment are a better factor. While planters with concrete boxes can look very pleasing, I do believe that where we can avoid using concrete, we should. Using timber for our planting can be better in specific scenarios. Let us use concrete only where it needs to be used, for example, in the foundations of buildings.

Gardening can also serve as a reminder for patients of their past, helping patients and residents relive their old memories. This is a continuation of senses as well as a connection with memory. Memory comes from landscapes and landscapes, vegetation, smells and visions. As a benefit, all plants and flowers need to be locally sourced. When we consider gardens, we need to look at the public settings for the landscape and the private gardens for dementia patients and elderly citizens. They are types of archetypes to consider the public and private gardens.

PUBLIC GARDENS

Public gardens are spaces that play a crucial role in helping towns develop sustainable practices. A lot of public gardens can be designed to fit a specific program. Designing a clinic will allow the public to contribute to designing for the public.

COURTYARDS

Courtyards are exterior spaces that offer multiple activities for people and animals. They are connections between the interior and end exterior. Courtyards offer a transitional break in a building. Unlike gardens, they do not need to be placed on the exterior of the building. Courtyards should also be designed with light in mind, large enough for light to enter the building. The type of courtyards should be added to the program when designing courtyards.

THE PRIVATE GARDENS

The private garden for residents is beneficial. It should be small and easy for the residents to maintain and maintain their privacy. They are looking at A Nursing Home in Sweden by Thea Grunfeld and Ann Vangsgaard (Vangsgaard and Grunfeld 2012). They do recommend seating in the private gardens. As a note, I believe open spaces for light to travel would also be beneficial

PRIVATE GARDENS FOR DEMENTIA RESIDENTS

Bahn et al. (2005) and Hartig et al. (2006) recommend that the gardens need altered accessible flowerbeds, colours and defined contrasts. From the Gardening theory (Morel 2019), it is recommended to understand the different colour schemes to design according to them. In my view, there are colour schemes that need to consider, especially when choosing plants, because greenery is a factor, but other colours need to be added to consider. If there are any other access routes on the private plot, the roads must be significantly separated from the colours of the landscape, avoid the greenery. Understanding the recommended colour schemes could also help select types of plants in the prescribed area.

Similar or opposite can create, but I recommend that the project should follow the scheme when the designer selects which scheme they will follow as a standard.

COMPLEMENTARY COLOUR SCHEME

Complementary colours appear opposite to each for. For example, orange and blue or yellow and purple are placed together. Regarding colour and foliage, the correct combinations of complementary colours can create an aesthetically inviting environment. With complementary colours, the pictures look better together than they do apart.

ANALOGOUS COLOUR SCHEME

Analogous colour scheme refers to colours next to each other on the colour wheel, for example, looking at yellow and green.

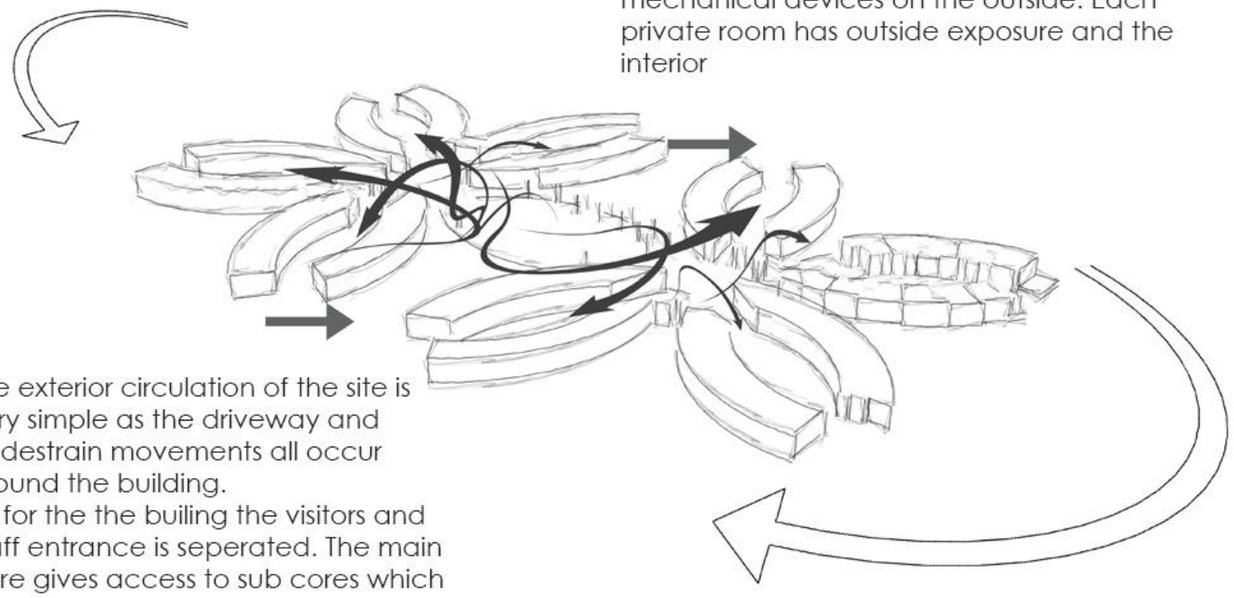
Sakuragien - Elderly care Facility

Building for Elderly Care
Location: Mutsu, Japan
Architects:Kazuma Yamao (Waiwai Architects)
Landscape Architects: GA Yamazaki
Main Contractor: Laing O'Rourke
Mech Eng.: EOS Plus
Structural Eng.: ASA

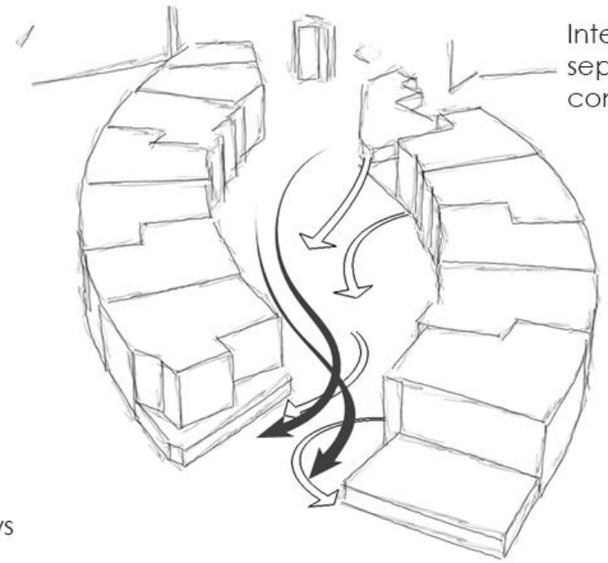




The Elderely care facillity, uses very large windows and skylights to allow light to enter. The timber used in doors and warm colors add to patients warmth



The exterior circulation of the site is very simple as the driveway and oedestrain movements all occur around the building.
As for the the builing the visitors and staff entrance is seperated. The main core gives access to sub cores which connwcr ro 4 living wings.



Interior spaces all separate rooms conected to a core

From gain access to the core and hiding all mechanical devices on the outside. Each private room has outside exposure and the interior



Figure 24 Sakuragien Analysis Poster

FACILITY

The Sakuragien Elderly care facility is a building I used that I believe works in the design for privacy for the patients, system monitoring for the services, location for the staff, and circulation. The centre made a good design that worked well in the design that fits a high slope. The slope has two entrances on the site—the building's lower and upper ground floors.

The form of building seems to have the form of flowers or leaves lying on the ground. The use of the form is a great design. I believe Biophilic design should have been used on the inside as well. The use of leaf patterns in the windows and walls helps to make the wings easier to separate. I believe the sections could have been separated by using biophilic principles of colour or design to see differences.

The solar analysis of the building shows that the patients on the northern wing do not receive as much daylight as the patients whose private rooms are on the southern wing. In my opinion, the patients living quarters should be placed in the Southern wing as much as possible.

The use of timber is treated. The material chosen is a good choice, looking at the timber used inside the building. Although I agree with the timber in the interior, I cannot entirely agree with the white used in the building as the interior looks the same and would make it difficult for elderly patients to be able to differentiate in the space. Accordingly, I believe timber as a style in Japan is a well-used design that makes the use well done.

The wet services of the building work in a manner for at least 16 residents to share almost three bathrooms. In this sense, I believe privacy and cleanliness would not work. Each resident should have private bathrooms in their rooms instead of causing patients to share. In terms of services, because the private rooms are on the exterior, it allows for simple methods to repair. It would be preferred to know how the plumbing layout was performed

The use of vehicular circulation works very simply as it goes entirely around the building, which I believe makes the drop-offs on either entrance work appropriately. I question the use of the parking bays in the building because I believe circular parking bays leave dead space. However, the dedicated pedestrian routes are broken and seem to need to cross into the road. I believe there should be more pedestrian routes in the building

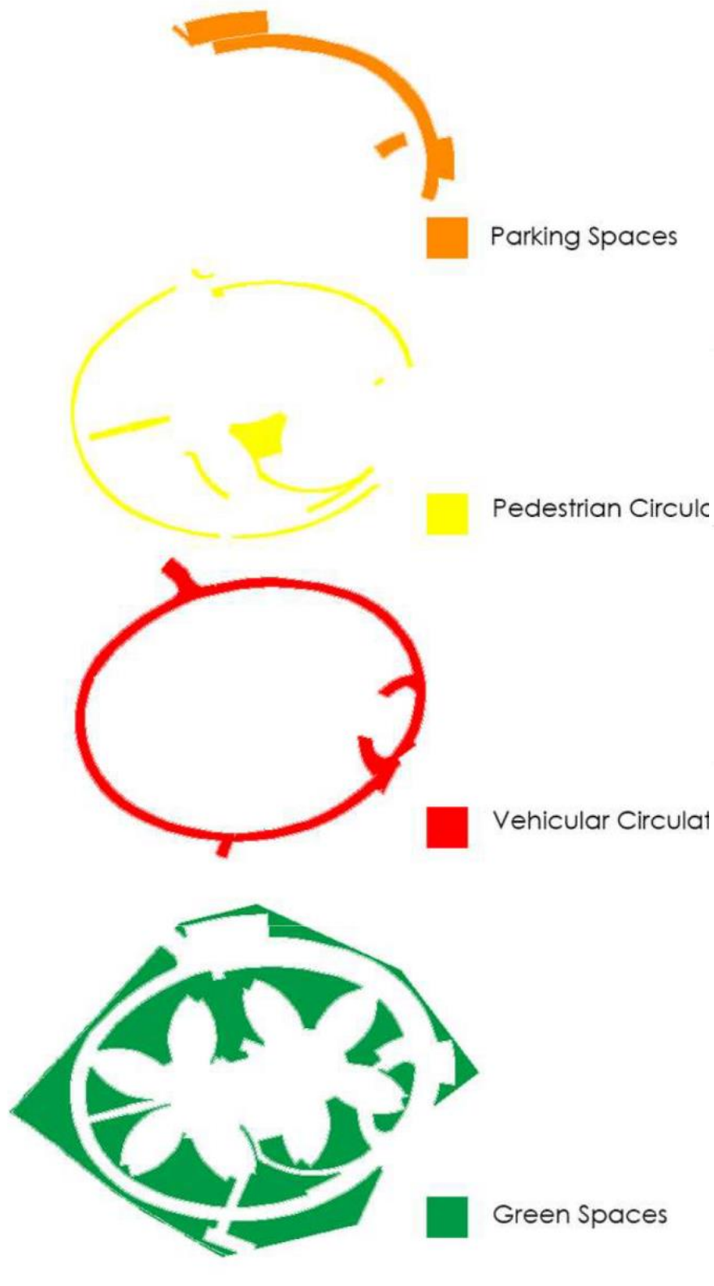
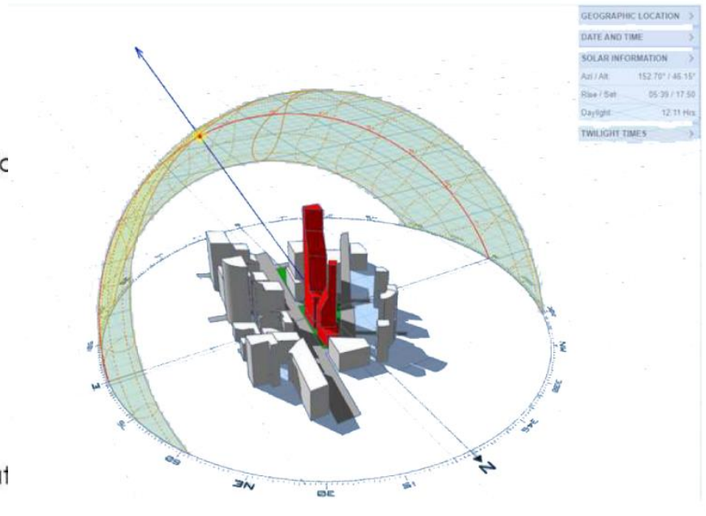


Figure 25 Sakuragien Circulation Diagram by Kamohelo Motopi



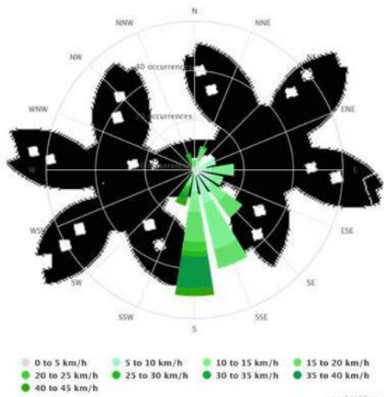


Figure 26 Positive/Negative, Solar and Wind diagram by Kamohelo Motopi

I believe looking at the positive and negative diagrams to see the skylights that are accessible made sure that the public sections of the building received enough natural light for the building to work. However, I believe that there should

have been skylights added to the rooms in the northern section of the building to allow more natural light to enter the building. Servicing would be a hassle, and the sounds may be alarming to patients, but I believe it will be more than possible with skylights and vents already in the design.

I believe the building does not use the views of the Mutsu Japan. There are occurrences where designers cannot choose the site, but I want to believe the space of Mutsu Japan gives a beautiful cityscape. The conceptual section offered a lot of my greenery and around the building, but sadly none of the exterior and interior pictures of the site offer any of this.

The offices are located centrally with the main entrance to the building, and to promote the independence of the patients, the private residents are placed closer to the exterior of the building, which allows them to be able to get access to the exterior of the building.

The public and private spaces allow for social interaction located close to the building. I like the fact the building has made the pedestrian movement the centre of the movement on the site.



Figure 27 External shot by http://photo-spiral.co.jp/

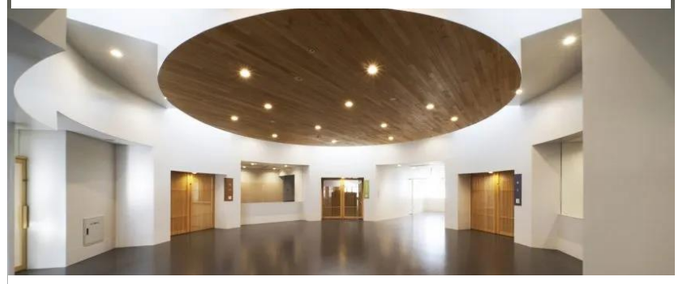
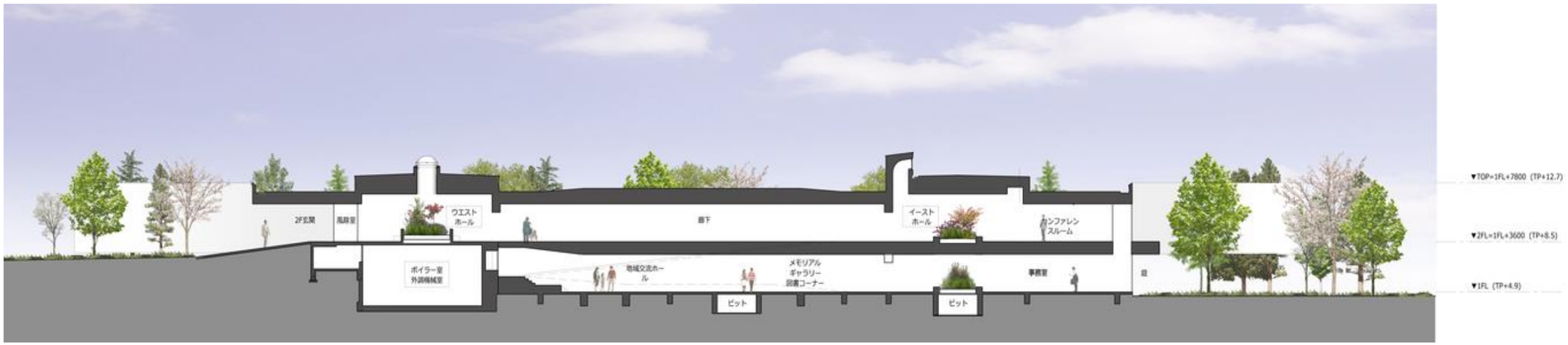


Figure 28 Interior shot by http://photo-spiral.co.jp/

Figure 29 Building zones by Kamohelo Motopi



THE SENORITA NHLABATHI HOSPITAL

was a newly built hospital located just on the outskirts of Ladybrand, spaced between Ladybrand and Manyatseng . The hospital, despite the upgrades, has not gotten the foot traffic as expected it would. The main transportation routes, taxis and buses do not stop in any location near the hospital. The location of the hospital was not considered when building.

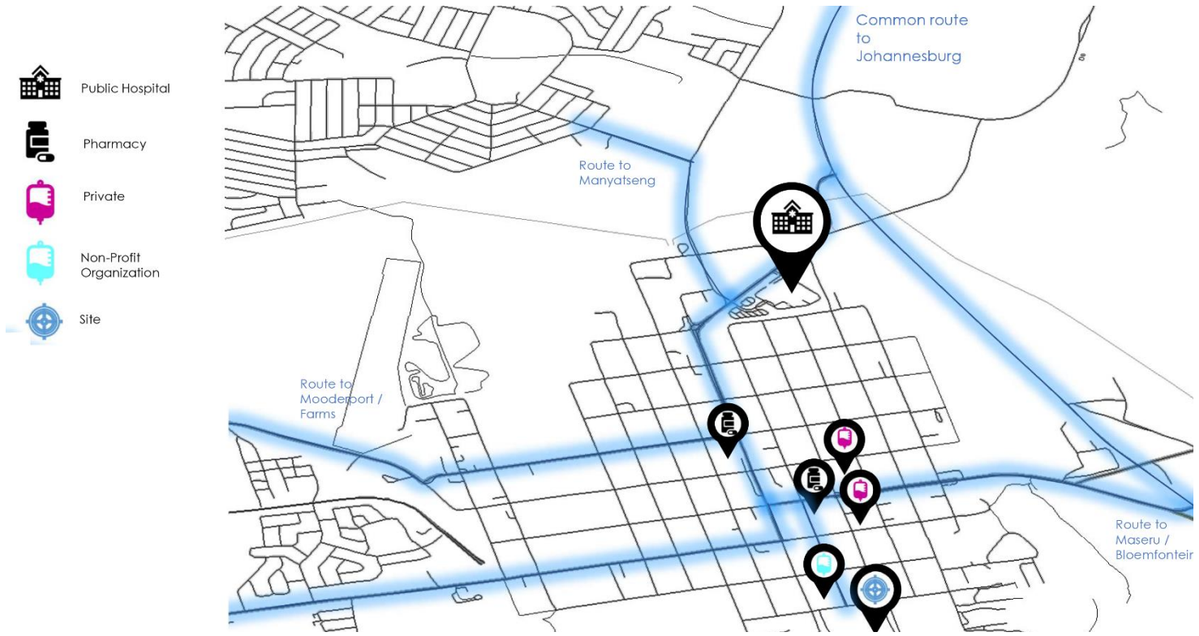


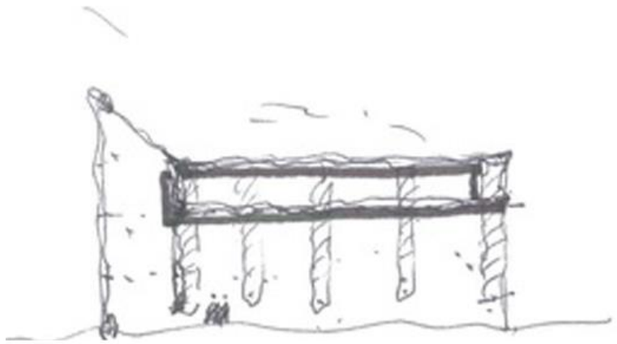
Figure 30 Medical Diagram by Kamohelo Motopi

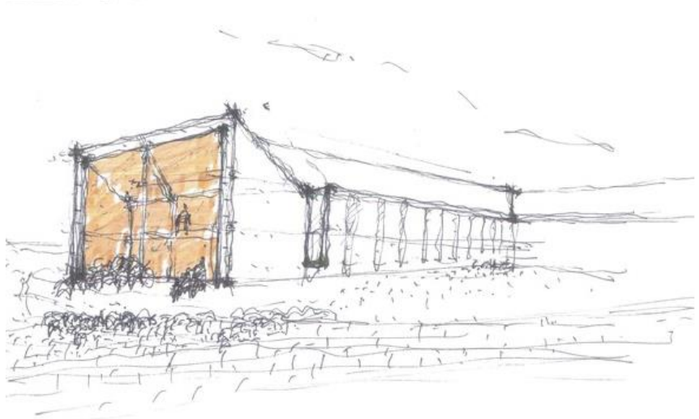


Figure 31 Transportation Diagram by Kamohelo Motopi

Nelson Mandela Childrens Hospital

Hospital focused on Childrens care
Location: Johannesburg, South Africa
Architects:Kazuma Yamao (Waiwai Architects)
Landscape Architects: GA Yamazaki
Main Contractor: Laing O'Rourke
Mech Eng.: EOS Plus
Structural Eng.: ASA





McLaren, T., 2021. Sketch of Nelson Mandela Window Entrances. [image
Available at:
<https://www.archdaily.com/870774/nelson-mandela-childrens-hospital-sh
ppard-robson-plus-john-cooper-architecture-plus-gapp-plus-ruben/591043e
1e58ece65420003b5-nelson-mandela-childrens-hospital-sheppard-robson-pl
us-john-cooper-architecture-plus-gapp-plus-ruben-sketch?next_project=no
> [Accessed 31 May 2021].

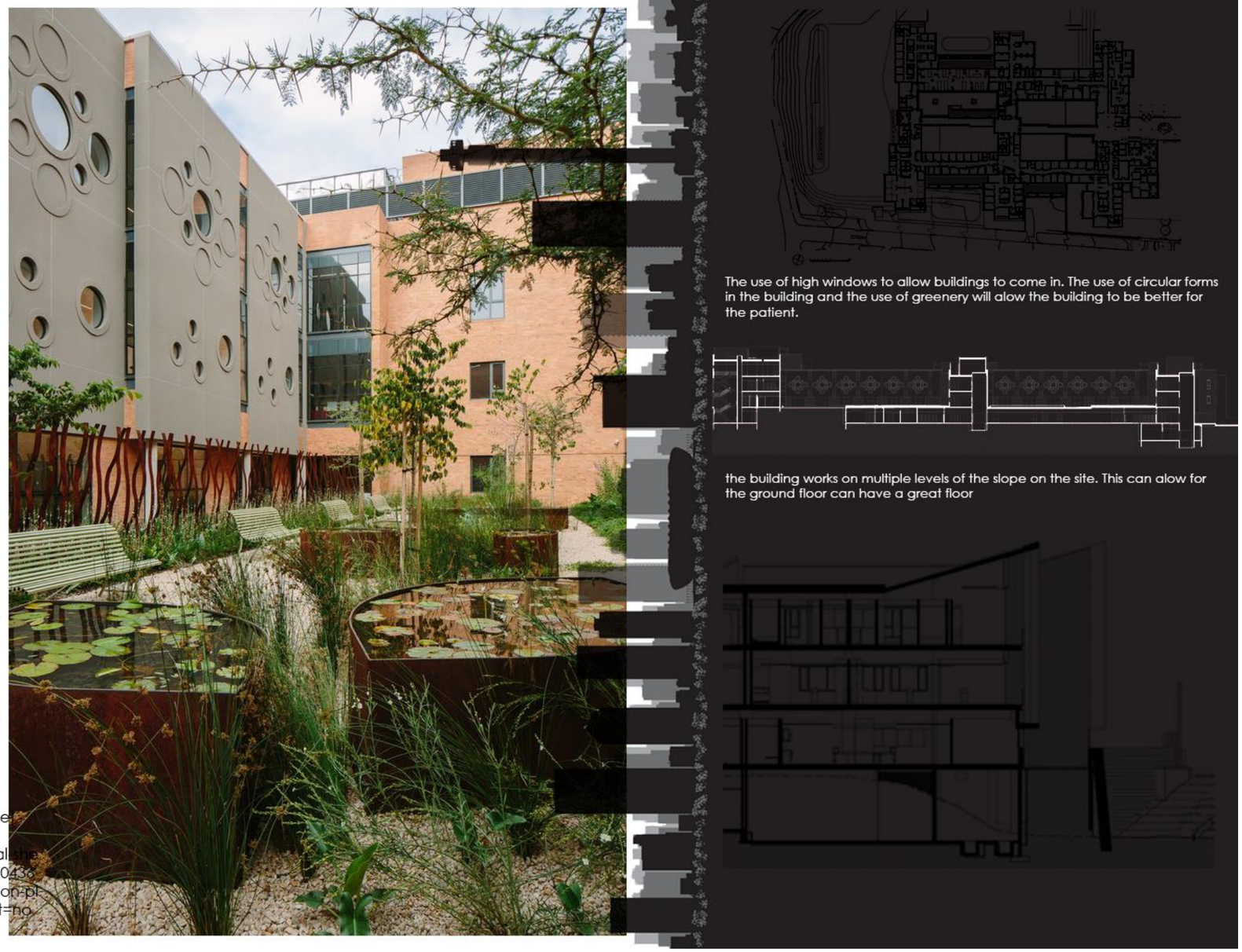


Figure 32 Design Poster

NELSON MANDELA CHILDREN'S HOSPITAL

While the Nelson Mandela Children's Hospital focuses on children, the design creates landscape features in the gardens and courtyards that I wish to implement in my final project. The landscape designers GREENinc, have aimed at the concept and principles of therapeutic landscape design. Landscapes designed with therapeutic value are designed to encourage users of the spaces to interact with nature and make an intense healing process.

Therapeutic landscape design aims to solve four main challenges: visual and physical accessibility, mobility for all people, a variety of functional spaces that meet different needs and the provision of sensory stimulation. The original design by Sheppard Robson had five internal courtyards and five external gardens, with functions related to the spaces they were in proximity to.

The external garden at the arrival court aims to create a stress-free environment. This is achieved by colourful signage, comfortable seating, large trees, and flowering plants.

The café terrace next to the circular pond, seating, and a lawn area to fit functions with multiple users.

The internal courtyards ensure every hospital user is exposed to as much natural light as possible. The courtyards are influenced by the program unit they are placed under. The day garden is small, close to the reception area. The space attracts patients with life-sized sculptures by artist Mary Sibande, placed in a densely populated vegetative environment. Colourful benches and tables are placed. Preferably the colour schemes need to be designed for an elderly patient, but the use of the colours is considered.

The healing and quiet gardens are passive courtyard gardens situated on the lower ground floor, next to the surgical theatres and intensive care wards. These spaces aim to create a peaceful and restorative environment where visitors can experience a reprieve from their stressful situations. The quiet garden is the most secluded area and aims to give users a quiet time in a natural setting. The designers have added six mosaic panels by the Soweto Art Ladies Mosaic co-op showing prayers created by children during a workshop. They allow family members to add their prayers from the branches of the trees, creating emotional healing.



Figure 33 Entrance Image by https://worldlandscapearchitect.com/the-landscape-spaces-of-nelson-mandela-childrens



Figure 34 Quiet Garden from https://worldlandscapearchitect.com/the-landscape-spaces-of-nelson-mandela-childrens-



Figure 36 External Garden from https://worldlandscapearchitect.com/the-landscape-spaces-of-nelson-mandela-childrens-



Figure 35 Nelson Mandela Entrance https://worldlandscapearchitect.com/the-landscape-spaces-of-nelson-mandela-childrens

MEDICLINIC MIDSTREAM

The position of the Mediclinic midstream in Olifantsfontein of the hospitals offers a view of the highveld. I am creating a beautiful scenic view for the end users. The hospital is within walking distance of the midlands estate and Olifantsfontein residents, putting the project in an ideal location. The primary vegetation of the site is on the right of the building instead of the main building.

MEDICLINIC GARIEP



Figure 38 MediClinic Midstream Site Diagram

The Mediclinic Gariep hospital is further located at the edge of the Gariep area, allowing the space to grow. The clinic uses courtyard spaces in the clinic. The parking of the clinic allows for staff and visitors to be separated.

THE TYGERBERG HOSPITAL

The Tygerberg Hospital is a large hospital in the Western Cape. The program of hospital operates ideally for circulation. The Intensive Care Units, Operation Theatres and Administrative blocks are located together. This process works great to avoid visitors and families



Figure 37 Gariep MediClinic locality Diagram

wandering off into wards. The wards have views into courtyards which is also a good point.



Figure 41 Gariep Mediclinic Parking Diagram



Figure 39 Tygeberg Hospital Section Diagram

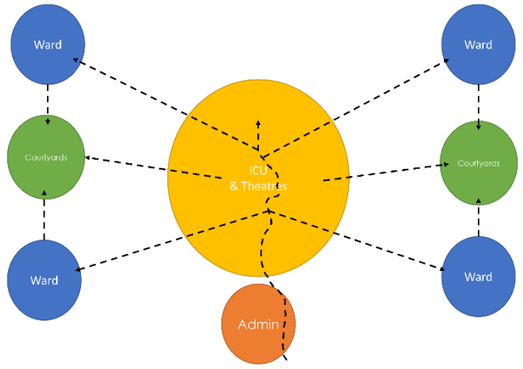




Figure 40 Tygeberrg Hospital Site Digram

Daylight Principles

In this chapter, there is a focus on Daylight principles and how to implement them appropriately. The sections to overlook are the following sections:

- Diffuse Light
- Contrasts
- Atrium – Skylights
- Colours
- Courtyards

Daylight access into a building lets users carry out tasks and make financial and energy consumption decisions for artificial lighting during daylight hours. Sun diagrams and daylight factor calculations can be used when deciding factors such as roof overhang and windows and the size of windows and doors. (Designing daylight solutions for commercial buildings 2021)

Preventing glare is an issue for building users, especially those working by machines or not sitting within a space. For this issue, space planning needs to work appropriately to ensure users do not suffer from glare during daylight.

DAYLIGHT EFFECTS ON HUMAN HEALTH

light entering the space. The light-hitting plants can create a calming space.

Good daylight can supply enough positive thoughts and mental well-being. Morning daylight positively affects the treatment of depression and recovery time (Lundin, Healing Architecture: Evidence, Intuition, Dialogue 2015). Roger Ulrich released a paper with results from 46 patients recovering from operations compared with patients in rooms with direct view to windows and rooms with obstructed views. The research noted the room's colours (the study had patients whose room colours are blue and green), age (all the patients excluded were patients younger than 20 and older than 69.) and previous hospital stay, among other factors considered. (Ulrich 1984). The research showed a difference in the recovery of patients. Ulrich concluded to take strong consideration of external views. Consider the types of lighting as well.

DIFFUSE LIGHT

Diffuse light comes from a large surface, depending on the materiality. This means it can directly emit light or strong reflecting material. (Wong 2020) Sunlight is an example of diffuse light. Depending on the material sunlight hits, corrugated sheeting creates glare or a curtain to reduce the light.

An example of making a friendly shadowless space using natural light is the Bosjes Chapel in the Western Cape. The high slender roof mimics the ridges and valleys of its site. The wide curvature allows for light to travel into the building with the correct spaces. The light has a let light enter as a gospel effect on the landscapes.

CONTRAST

Contrast is the ratio between dark and light parts within a space. There is high contrast and low contrast. High contrast has an extensive range of tones, ranging from

This section gave information to influence the design. The project is not only about light in architecture but rather spaces. With light daylight, the design can create healing and comfortable spaces.

significant highlights to dark shadows. Low contrasts have a smaller range of tones.

SKYLIGHTS

Skylights are natural light-transmitting structures made of a translucent material that forms a part of the roof for daylight purposes.

COLOURS

Daylight's effect on materials can create intense renderings of space. The Nelson Mandela children's hospital wing has light shining into the room, and the sunlight with the orange-coloured walls compliments well, giving a warm mood.

COURTYARDS

The light breaking in from courtyards allows light to enter spaces connected to the courtyard. The light allowed to enter the spaces in the building. While both courtyard and gardens plantages need to be considered as the

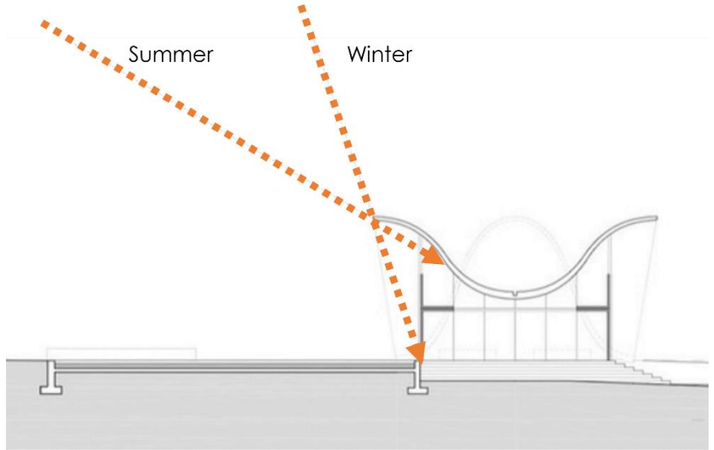


Figure 42 Bosjes Chapel Section with Sun diagram

Artificial Lighting

Clinics may not always function during the day. Daylight may not always be enough. Considerations for the need and effect of artificial lighting are essential for design development.

Healthcare facilities need lighting to support the users, patients, staff and visitors. To develop a good balanced combination of natural and artificial light, the characteristics of lighting demands are broken down into three sections. Stidsen (Stidsen 2013) inspires these sections.

LIGHT FROM A HIGH-RISE POSITION IN THE ROOM

When lighting is set from a high position, it works with activities that need good lighting with fewer shadows. It works well for staff working with patients but also supports the physical and mental activity of patients.

Lighting in a high-rise position is commonly used in public buildings. It is a functional type of lighting and builds control should question its use, especially if used throughout the building. Architects should be able to justify their reasons for this type of light.

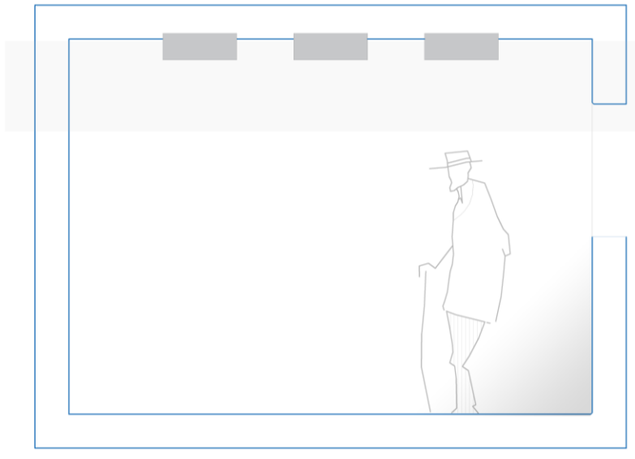


Figure 44 Light source from above



Figure 43 A single empty hospital bed in a patient room, located in the Clinical Research Center, National Institutes of Health (NIH), Bethesda, Md. , by the Clinical Research Centre

LIGHT FROM A MEDIUM HEIGHT POSITION TO THE ROOM

Light agents lying equally from the ceiling and the ground do not fully spread light around, unlike light distributed from a high position. Light from this position does control for its users, and it would be based in spaces that are more private and create a sense of control.

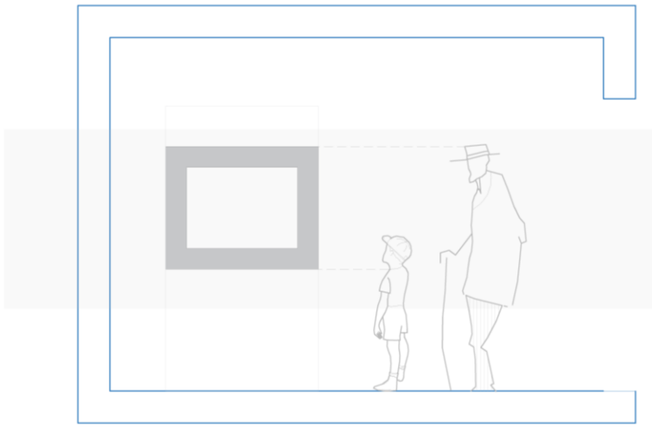


Figure 46 Light from a medium source

LIGHT FROM A LOW POSITION IN THE ROOM

Leading lights at a position close to the skirting can be compared to nocturne lighting in aeroplanes. When lighting is set low, the shadows get longer, and the

illumination acts as a navigation agent within the room. When a patient needs to use the bathroom, needs assistance or medication at night, they benefit from not being influenced by the high intensity of light.



Figure 45 Light from a low position

HIGHER LIGHTING INTENSITY DEMANDS

Elderly patients have impaired vision, so their need for light will differ significantly. Too little light and too few contrasts result in difficulties for elderly patients to navigate and orient themselves inside a clinic. The lack of results can result in elderly patients with Dementia, balancing issues or any sort of head trauma.

This project does not focus on daylight and artificial lighting as a whole. This section focuses on spaces that use artificial lighting as a healing component. This section informs on designing spaces through the use of light to create a healing and comfortable space.

Sustainable Architecture

Sustainability does not just cover environmental impact but other factors that create sustainable Architecture. Sustainability is a global issue for all professionals. However, Africa has been a minor contributor to greenhouse gases. One of South Africa's goals to reduce the consumption of o-zone depletion substances (Statistics South Africa 2019). This is what requires building regulations to be tightened and specified.

WHAT IS SUSTAINABLE ARCHITECTURE

In 1987 the concept of sustainable development was described by the World Commission on Environment in the report Our Common Future (Brundtland Commission 1987). When a sustainable building is considered, Architects need to consider long-term and short-term factors. This can result in sustainable architecture's economic, environmental, and social factors.

The green building council of South Africa and the South Africa Council of Architects offer incentives and training for professional Architects. The aim of offering incentives like certification and CPD (Continuing Professional Development) points. Green building allows countries sharing across to give knowledge. The SACAP system and building regulations of South Africa are the foundation for Lesotho's regulation. I believe South Africa's green building development and guidelines will create a ripple effect on its neighbouring African countries because currently, other African countries use South Africa's Architectural Council as a reference and pay for South Africa's Green Building Council in their country. The Green Building LCR (Local Context Reports) allow different African countries to show their green building strategies and learn from each other.

The green building council of South Africa offers training in various sections of sustainability and green building. By offering green ratings in building performance, new buildings and renovations, among other sections in the built environment. The sections that come through also consider energy consumption in a building to receive certification. In terms of power, now, municipals in South Africa offer discounts on certain green energy implementations.

FLEXIBILITY

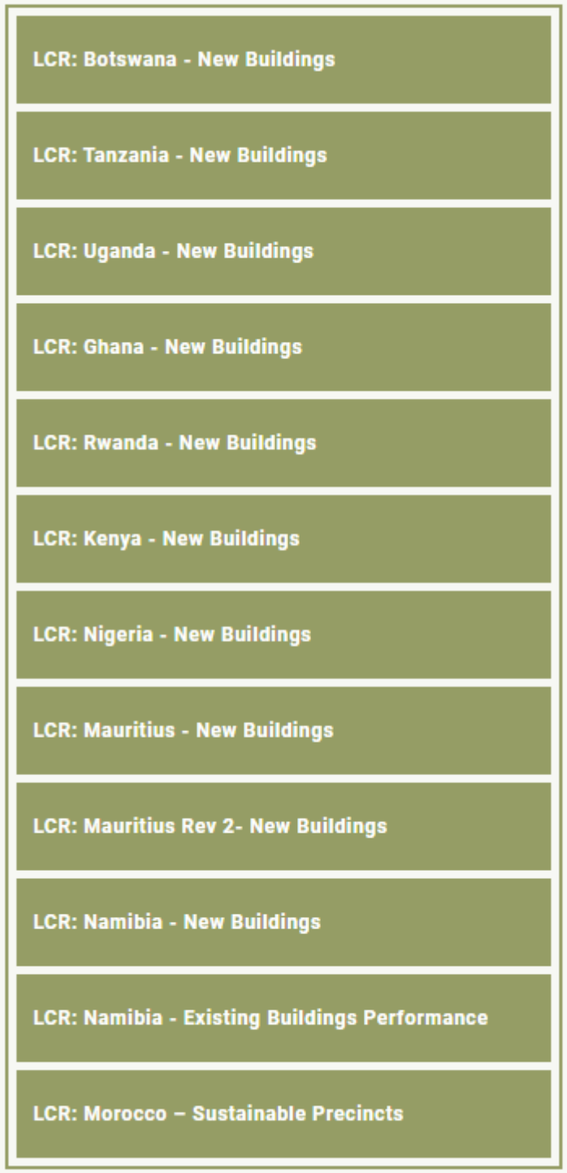


Figure 51 Various Local Context Reports released by Green Building Council South Africa

SUSTAINABLE TOOLS

They are using sustainable tools to create Architecture that will reach an excellent sustainable quality. The sustainable stages need to be considered in an early design stage.

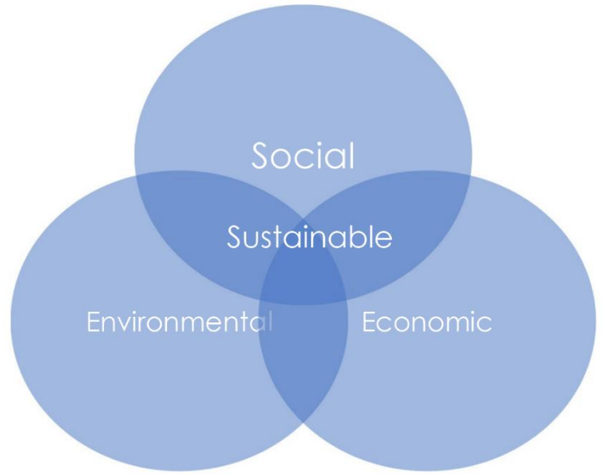


Figure 52 Sustainable Diagram

MATERIALITY

The materials used in and around the building must be considered. They affect the well-being of the users.

In use, the designer should:

- Try to re-use elements as much as possible
- Emphasize natural elements
- Optimize the entry of natural light into the appropriate space
- Use of paints and finishes that are ecological. About paints, recommendations to avoid synthetic paint products.
- Have the materials be in the proximity of the site. It will save on transport costs if the chosen materials are in the vicinity.

FURNITURE

The furniture in and outside the building should complement the building's envelope. The majority of the furniture should be made from natural materials. If

possible, the furniture chosen should not generate much dust.

When considering furniture, you need to consider breathable materials, consider fabrics. When thinking of fabrics, I think of them as how a cotton jacket sits in me and compare it to how it breathes compared to polyester.

FAVORING CARE

In a healthcare building, comfort and a positive environment. The storyboard in the design. I would recommend that a designer to be able to make storyboards of the spaces at different times of the day. The drawings should take note of the materials. The drawings should show where the light enters the space. Draw users in the space to display the relationship between the users and the space. Designers should also draw furniture in to show how the space will be covered.

The storyboards should have colour to be able to gain an understanding of the mood of the space. If the furniture has been selected, the designer can be modelled and placed in the space for the storyboard.

LIGHTING AND ENERGY SAVING

When considering the lighting you need to consider several factors when performing the lighting. My research found the primary flavourings for natural lighting. However, you must consider glare, especially for workspaces with computers and reflections. We want to

FORM
Plan
Shape
Height
Level
Construction & Material



MATERIALS & CONSTRUCTION
Consider materials with less of a carbon footprint
Prefabrication elements
Recycled Material
Recycling & Decomposition
Life Cycle Assessment
Transport of Materials



ensure that light enters laterally and on the opposite side of the working users, to avoid glare.

In the event of video conferences/calling spaces, lighting should be placed in front of the face to avoid being seen in the dark. It is advisable to favour light entry from different facades of the building. This gives the user the feeling that the day is evolving.

The users would have to use artificial lighting at night or on cloudy days. I believe here the storyboard could be used especially if done with 3d renders with specified types of lighting. A good understanding of the light types may help with the appropriate space. For example, looking at more than 3000K lights gives a feel of a cold room. Lights that are 2700K are recommended for workspaces. However, regarding suspended light fixtures, 2700K + seemed excessive for ceiling lighting. Suspended lighting features to create a more welcoming space. The 2700K – lighting can make LED lighting great for suspended lighting.

With lighting energy saving that comes with LED lighting. For transitional spaces, i.e., passages or spaces people will not spend much time in, lighting devices with presence detectors. The other option is to illuminate on steps and on methods to highlight emergency exits. The implementation of energy-saving methods should be considered like solar panels.

ECONOMIC VALUATION

In construction, money cannot be ignored. The professional fees are considered, and the professional fees' execution of the material budget. The Financial section will charge the rates daily and per square meter. In terms of the figures, there should be a margin of error, which will be shown in the financial section.

The breakdown of the costs to match towards with phases, to be elaborated in the financial sector:

1. In the preliminary phases, they look at ideas and distribution.
2. The primary/administrative to get necessary building documents.
3. In the project, I list all the materials to be used: lighting, furniture and finishes. In the professional space, digital drawings or working drawings would be an excellent example to work from.
4. The construction management of the project. To go through all the work stages and inspect the work, especially with Work stages 5 and 6. They give the final certification of work.

ORIENTATION

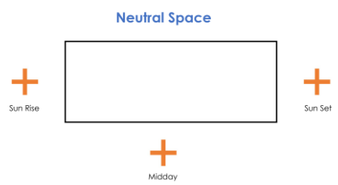
Form

Position of Windows / Openings

Size of Windows / Openings

Overheating

Energy Balance



OUTDOOR SPACES

Optimal Sun

Local plant sign

Preservation of home grown plantages

Influences on Microclimate

Maintenance without Pesticides

Cultural Significance of Plants

Bushes

Protective Planting

Awareness of wildlife home to plantage



INTERIOR CLIMATE

User controlled

Increased room height

Daylight conditions

Thermal comfort

Acoustics

Natural Ventilation at appropriate times

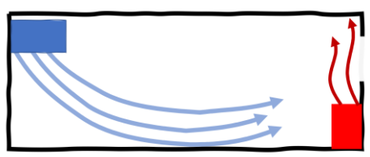
Mechanical ventilation at appropriate times

Skylights

Cortyards

Natural materials that abide to health regulations

Green designs



WORKING SPACES

Daylight Optimization

Reduction of Glare on workspaces

Sound Reduction in workspaces

Heat and Ventilation Control, based on materials chosen



SOLAR ENERGY

Solar Heating

Preserving Geyser Heat

Optimization of Daylight Supply

Solar Lighting

Reflectors and Shading devices

Glare and Overheating

Limited Artificial Lighting



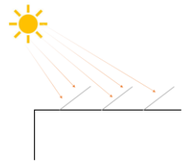
ENERGY SAVING TECHNIQUES

Control lighting in Rooms

Solar panels orientated to maximise sun gain

Evaluation of Insulation Thickness

Ventilation system with Heat Recovery



CHECKLIST

1. Ventilation & Natural Illumination		
Do you have natural ventilation in one side only?	Yes	No
Do you have cross ventilation in several facades to generate a natural current?	Yes	No
Do you have to turn the lights during the day	Yes	No
2. Thermal & Acoustic Insulation		
Do you think the chosen materials insulate enough?	Yes	No
Are the windows made with an appropriate quality? Does the glass have the appropriate UV resitant?	Yes	No
Is there excess humidity / condesation generated?	Yes	No
3. Envelope, furniture & vegetation		
Are the wall & floor finishes made of natural materials?	Yes	No
Is the furniture made up of natural materials?	Yes	No
Is there an excess of synthentic materials in the space?	Yes	No
Are there plants inside the building?	Yes	No
Are there plants outside the building?	Yes	No
4. Order in Space		
Is there enough cabinets for storage?	Yes	No
Is the space overloaded with furniture / objects that making cleaning difficult	Yes	No
Are there electric cable devices surrounding users?	Yes	No

Figure 53 Sustainability checklist for Failities Manager

The Charette

THE CHARETTE EXPLORATION 01

My charette exploration was what I thought was quite complicated. My first attempt was working with the wire to develop what I thought would be a design form to create. However, the design did not match the form creation of any of the designs.

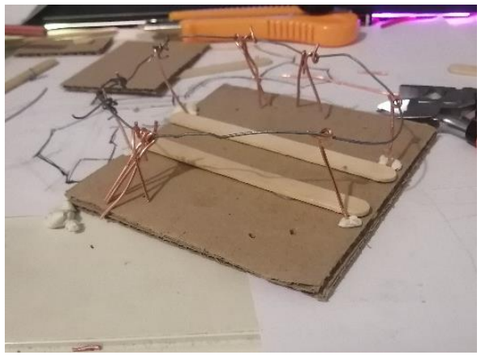


Figure 58 Wire form Model B

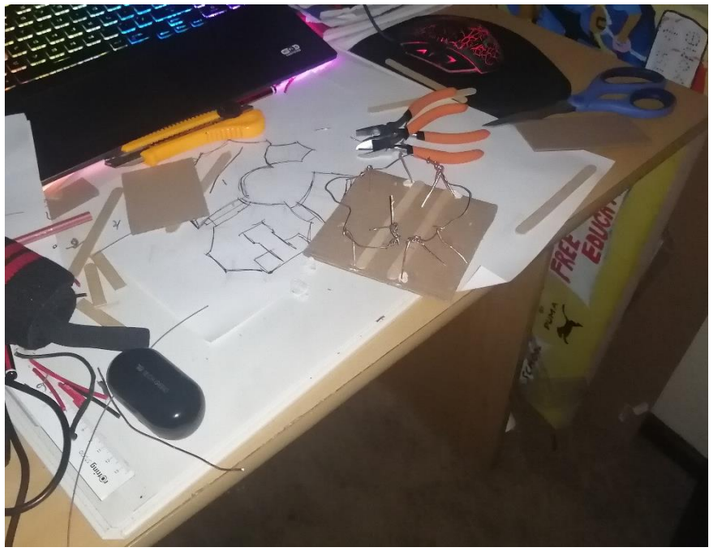


Figure 57 Wire form Model A

THE CHARETTE EXPLORATION 02

The charette exploration developed from clay modelling. The clay model was modelled from trying to develop a form that would compliement the site, but the form ideas just managed to create the forms in order to see how the forms would would relate with the site model.



Figure 54 Clay Model Design A

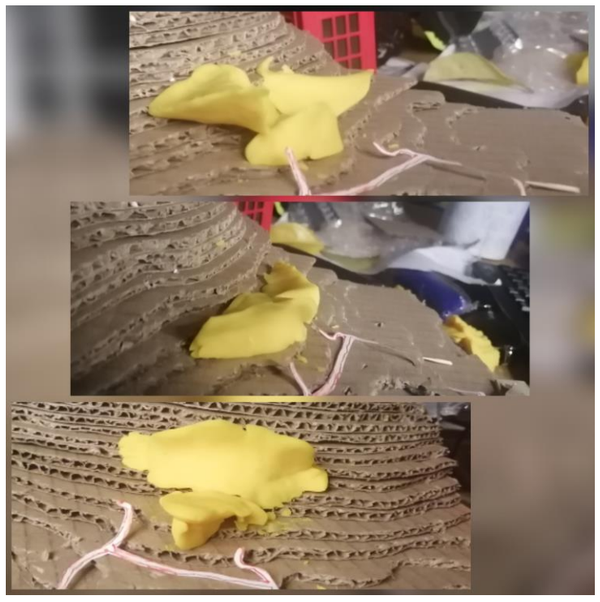


Figure 55 Clay Model on Site Model

THE CHARETTE EXPLORATION 03

The charette exploration developed from music being developed from coloured water. The water was made with the beats in the location the dam was expected to be. The different types of beats from the different molds , R&B, Rock, Hip, House and trance helped to create different dispersion methods to be able to consider in the design. The dispersion was caputured on cling wrap and overlayed on the site model to help create these different features I thought would represent the form of the building



Figure 56 Frozen Water charette A



Figure 59 Wasp Gathering idea



Figure 60 Froze Charette B



Figure 63 Site Model

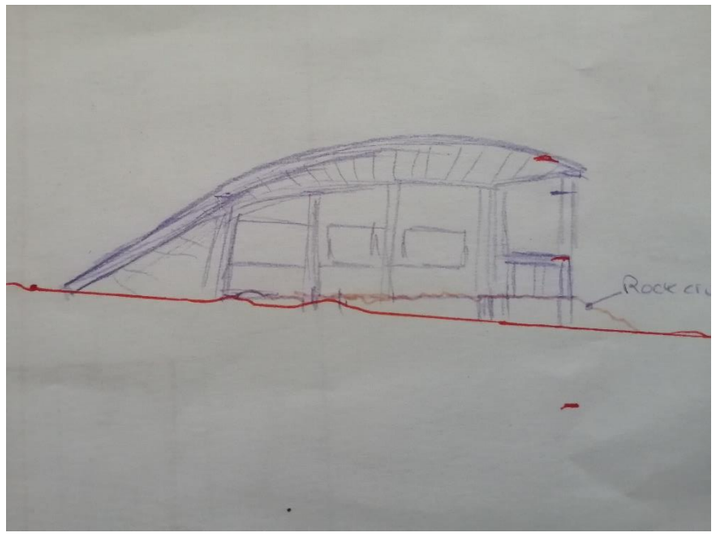


Figure 62 Building Idea

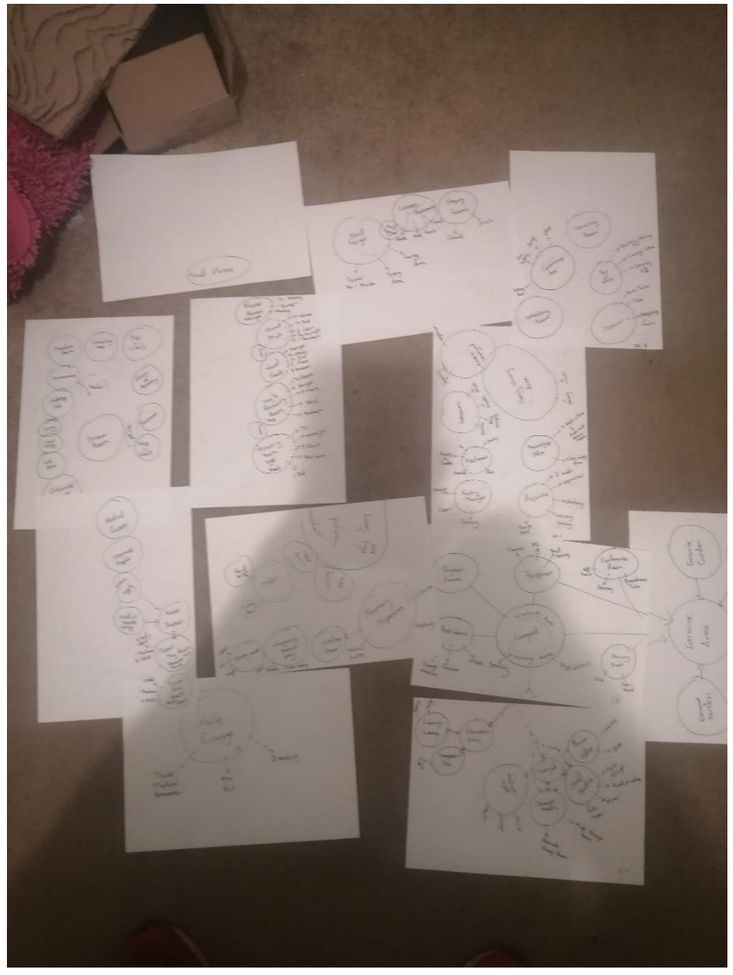


Figure 61 Space Planning layout

The charette design I decided was to take from nature, as I thought from Biophilia and watch wasps in their habit but that did not help in the form but in the idea to make circulation as simple as possible and allow for movement to be as simple as possible.

The only idea that developed to only make sense was using the charette to help with the planning of the river and be able to design the landscaping especially with water crossing into the area so the wire helped me realise the design should be elevation the clay opened made me realise the north opening public spaces should be designed to allow light enter.

Site Plan Designing

PREVIOUS SITE PLAN

The previous site did not do any movements to the site and did not look into maximise the site as much as possible.

Alternatively, how to address the wetland areas especially on the entrance of the site. This needs to be further explored,

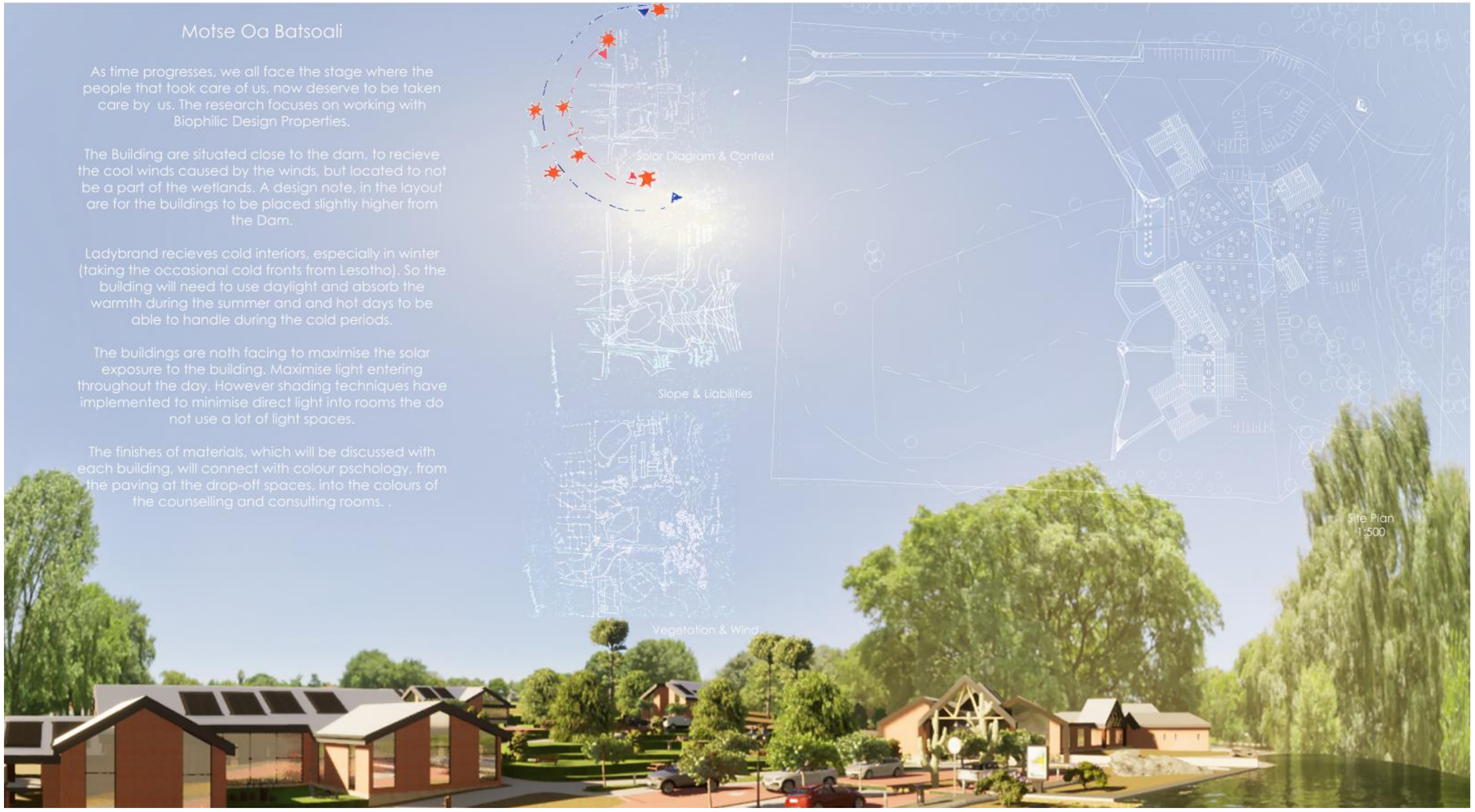


Figure 64 Previous Site Model by Kamohelo Motopi, 2021

Former Building Program

This facility must provide a supportive network of availabilities for the patients in and out of the centre. The building will provide an outpatient clinic, consultation spaces for specialists, transitional living for patients and permanent living for staff. Externally, patients will benefit from connections to the natural features, such as the park, courtyards and outdoor landscapes. Inside the centre must function as a preparation for the patient to accomplish and enjoy the external features.

The program of the healthcare centre has major programmatic components, which is focused on the broad goals of the centre. The centre will focus on reoccurring the patients frequently

GOALS AND OBJECTIVES

The overall goals of the centre are to address the needs of patients with intellectual disabilities, inside and outside. The program will need to extend beyond the building. The site will also need to serve in this regard. The first phase will connect with existing nursing homes within the community to offer daycare services if they cannot support the numbers. Establish a connection with the Senorita Nhlabitha hospital. The site offered social interactions with the community, giving the opportunity such, picnics, weekly outings, lunches and spaces for teaching.

The extended program takes into consideration nature and acknowledges the importance of nature as a therapeutic tool. Since the facility is located within a mixed-use urban fabric (residential, teaching and commercial spaces). Offers recreational activities which should complement the healthcare facilities program.

The centre's goals are focused on helping patients with intellectual patients within the centre and outside its walls. The main program for the building will serve as a function for patients to receive treatment regarding intellectual disabilities. The healthcare facility will serve as a facility with consultations, a day centre and staff living units.

RESIDENTIAL UNITS

A portion of the living units points to living units from staff who operate at the healthcare facility. The space will operate differently from the healthcare centre, as this will serve as a private settlement for the staff working at the healthcare centre. The clinic and centre will work on one nurse to 5 patients ratio.

The living units will allow for living units for the staff and allow for group zones where the group zones will be spaces where staff will have shared spaces, while in the back, there will be laundry services. There will be security spaces added to this building.

Common spaces will be spaced between the building. The laundry services will be on the further and a break courtyard in the space.

Reception spaces. The welcome area serves for staff to come and meet the staff members, without having any connection to the centre. The space just sits. A reception in the welcome area will have privacy thresholds, not viewing the private apartments with good light views.

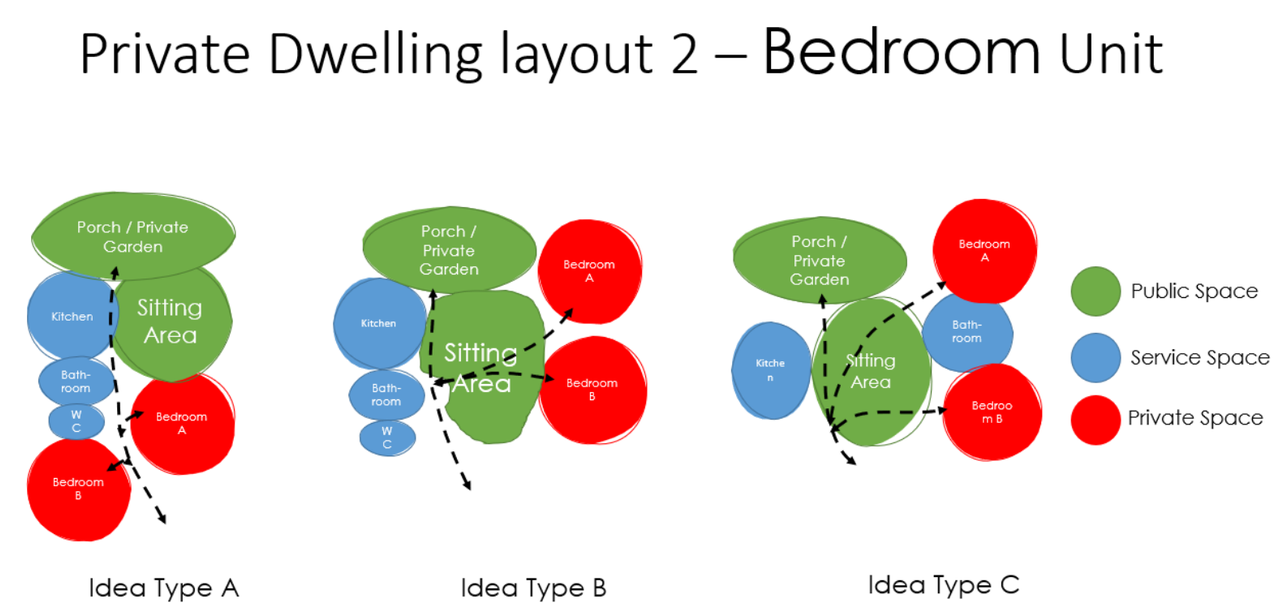


Figure 65 3 Bedroom layout

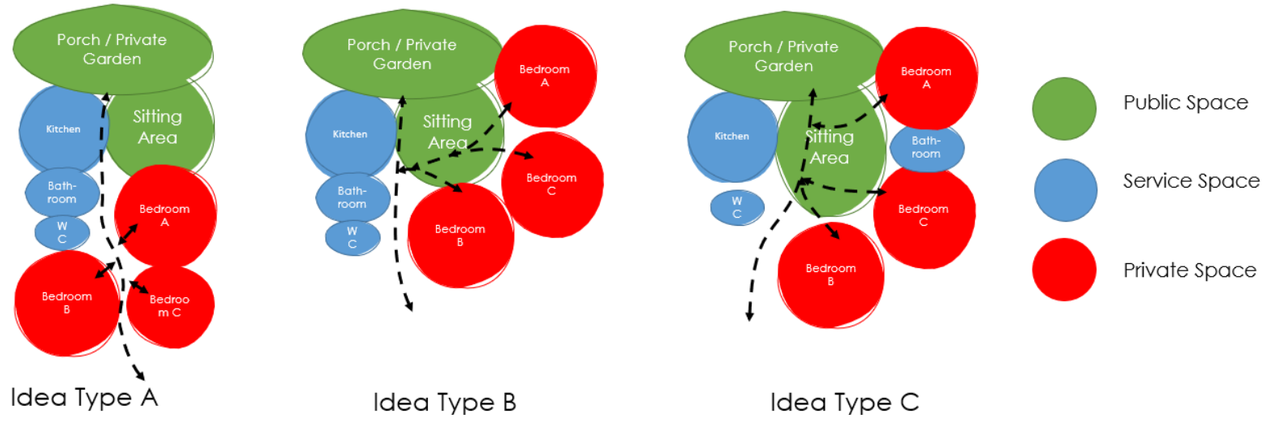


Figure 66 2-Bedroom Layout

THE CLINIC

The clinic will have out-patients services that will house the outpatient service for the community.

Waiting Area – the spaces for patients to wait will be connected to the private spaces.

THE DEMENTIA DAY CENTRE

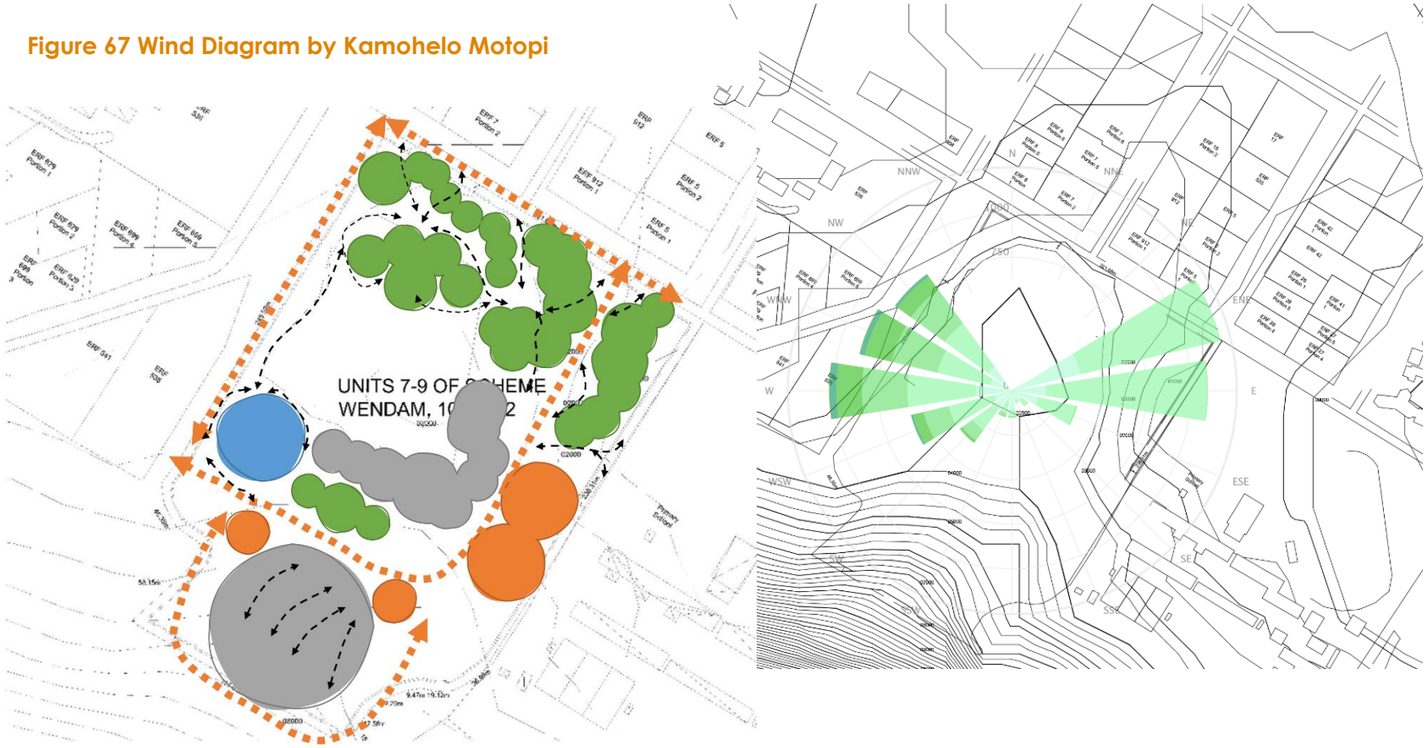
The dementia day centre will have two physio studios. The physio studios need to have access to direct sunlight and adequate seating, dispersed throughout the building.

The physio space follows to workout. There need to be spaces that a physiotherapist will work with their client and have a family member next to the consultation rooms.

Consultation rooms – The consultation rooms need to have enough space for a receptionist, a doctors consultation room and an examination room.

Offices – The space would be mainly for the facility managers and community members to

Figure 67 Wind Diagram by Kamohelo Motopi



Mapping

Building Site

MANTSOPA

Mantsopa is a municipality located in the Thabo Mofutsanyane district is a district within the Free State Province. It is located in the bottom portion on Thabo Mofutsanyane district. According to statistics home to 53, 525 people (Stats SA 2019). The site is located in Ward 2 of the Mantsopa municipaloity

Ladybrand

The siste is located on the back of the mountains separating Ladybrand from Lesotho. The neighbourhood is mixed with, residential houses schools and sports grounds. The topography of the site has mountains, hills, a dam, mixed vegetation. The ground is rough and stony. The site is less than 1km from municipal buildings (post office, police station, fire department) and city centre.

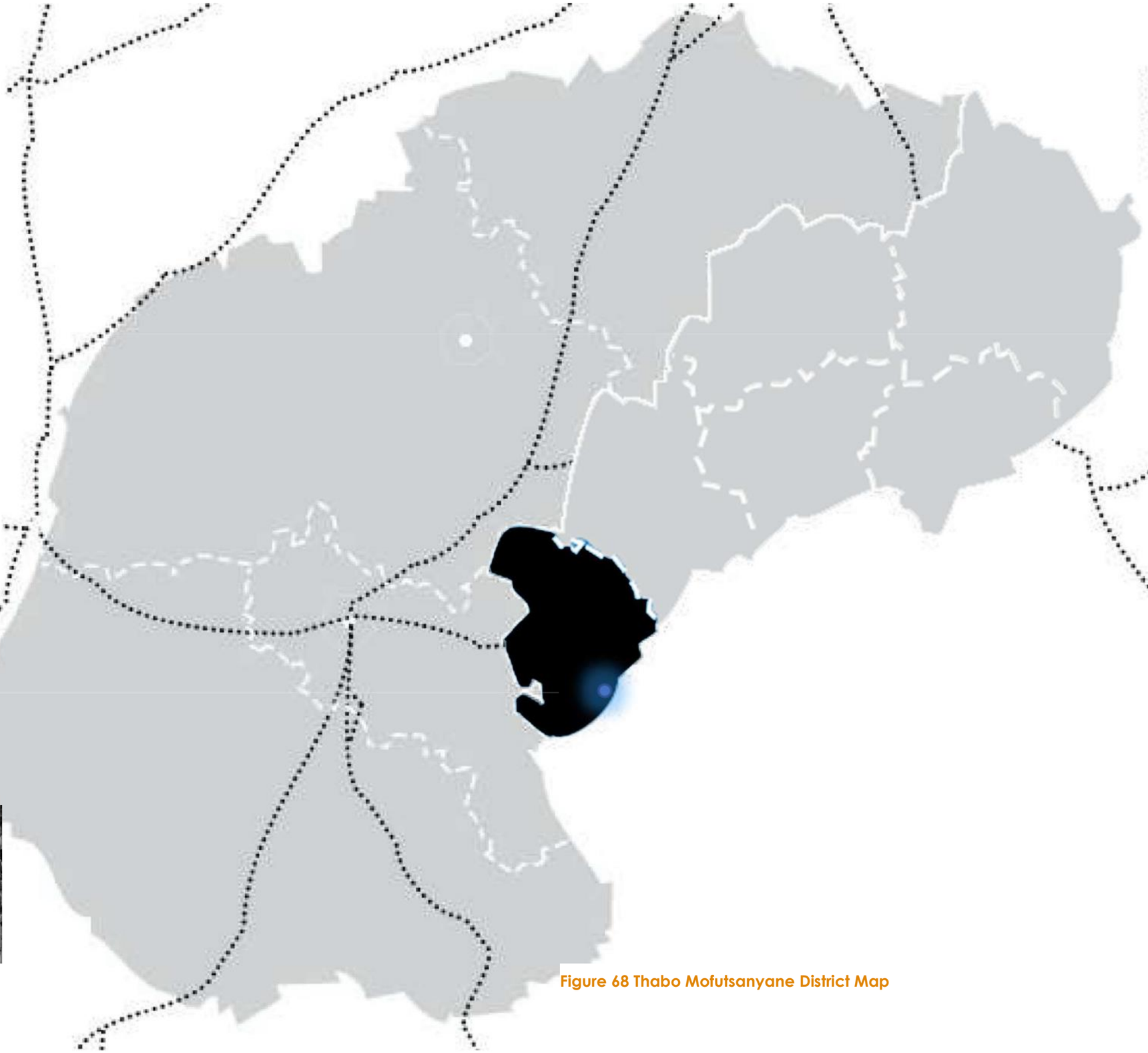


Figure 68 Thabo Mofutsanyane District Map



Figure 69 Lady brand Site Map

ACCESS WAYS

There are two possibilities for entering the site one established street and one unestablished street. The map shows the two possibilities, and the advantages and disadvantages of each of them are shown. The black lines mark the main roads, which make easy access to the site from the general infrastructure.

1. Access on the corner, Collins Street is a generally wide street to allow for traffic for the schools on the sides.
   The wide-scale allows for the allowance of open public spaces.
   If the health centre creates traffic, it will disturb the homeowners.

2. Access on an unpaved road on Collins and Joubert Street.

   The Jourber Street access through the site is a private dirt road with open green and private parking areas.

   The street provides a good staff access

   The scale is small and unpaid, with less detailed entrance and less inviting.



Figure 70 Site Access via cnr Collins and Erasmus Street



Figure 71 Access Way Map

TYPOLOGIES

The surrounding environments of the site have three types of main typologies which blend the district and large green areas. Here the characteristics of each area and photos illustrate the atmosphere in the area.

1. Residential Houses
   The area is made of consists of single – double-storey homes. The detailing is relatively low, mainly brickwork repetitive.

2. School Communities
   a. The site is close to Ladybrand Primary, Ladybrand Academy and Ladybrand High school.
   b. Ladybrand Primary is a school with wide public spaces next to the site.
3. Sports and Recreational Areas
   a. The site is close to the sports ground where high school students have access to the Ladybrand Stadium
   b. The site is close to a gold course and tennis blocks.

IMPRESSIONS

This collection of views shows the site viewed from different positions. Each view is numbered and described.

MATERIALS, VEGETATION & WILDLIFE

The building site and its surroundings are made with different characteristics and typologies. As before, the different Functions & Typologies, residential houses, School buildings and sports and recreational spaces. This material connects with the typologies and explores the adjacaent areas' characteristics.

1. Single residential homes
2. The materials are natural red clay brick, occasional corrugated roof sheeting, or tile clay. There is a growth of timber used in the area and the use of rustic art features.
3. Vegetation. The site is dominated by nature. With great power, vegetation and colours are given to understand the site. The colours and vegetation will be brought on as inspiration for the future building's relationship with the cultural surroundings. The natural stone and grass stand out on the site, giving the home a strong relationship with nature.
4. The Wildlife captured during summer expresses what is expected during the season.

MICROCLIMATE

When designing a building, the microclimate is an essential factor. Here the design responds to specific conditions and their importance in a healthcare facility.

SUN & WIND CONDITIONS

The wind rose diagram shows how wind speed and direction are distributed over time. The wind rose shows how the mountain blocks the wind coming from the Coast, the back of the site. The wind rose shows the dominating wind. It is essential to keep note of the winds coming from the West and East. Designs should be made accordingly to handle this. During the four site visits, there was no discomfort from the winds. This is not assumed because of low wind activity but because of the slope approaching the site, vegetation, trees, bushes and dam wall around the site. The majority of the vegetation on the site will not be removed, as the Architecture will work to settle into the environment. Outdoor spaces not screened by the building can use vegetation to limit the strong winds and add towards the atmosphere.

The sun path diagram shows the position of the dun at different times of the day and year. Overall it shows that the site gets sun during all the year's seasons, regarding the risk of spaces getting too hot during the summer. Regarding space planning, it is essential to consider the spaces that can handle lighting and outdoor functions.

TOPOGRAPHY & SHADOWS

The site's topography and its nearby infrastructure show unique characteristics, and the dramatic slope creates both a challenge and opportunity for the placement of the project. The project and environment should be inviting and accessible for older people with reduced mobility. Sections can be shown on the following page. The site is positioned high and slopes down primarily to the east. The sun exposure does allow for solar energy connection through out the year.

Shading becomes a question. A set of simple shading diagrams presented sunrise, midday, and sunset for the summer solstice, winter solstice and equinox. The diagrams show that shadows from neighbouring buildings will not be a problem through any season. Regarding the trees and the building placement, the shadows of the building need to be considered in the design process.

NB: It was noted that on the visit to the site, noise from the schools was not noted. There was no identified noise pollution. This must be due to the rise of the site. The adjacent area and road act as a sound-reducing barrier. This means there is no need for special attention to traffic noise.



THE PROGRAM

The building goes to a double-storey building and is set into the medical and public. The circulation of the building needs to be wide enough to allow for spaces but not large enough for a wheelchair and another person. There need to be courtyards that connect the building to the river and green spaces as a great connection with biophilic design elements.

The Intellectual Disabilities wing on the first floor and offices should be connected more to the private offices and have waiting areas on both floors to allow visitors in each area.



Figure 72 Solar Diagram by Kamohelo Motopi

Design Development

The healthcare facility is designed with primary care (accessible healthcare teams accountable for addressing most community healthcare needs). This centre will need to be designed to fit the community of Ladybrad, Manyatseng, Mauersnek, Maseru, and the farm environments around the area.

SITE ANALYSIS

The site on church street, Ladybrand, provides enough support for a healthcare centre providing primary healthcare for patients with intellectual disabilities. The site chosen is in a walkable community (it is easy to walk to the business area to purchase goods and services). It will serve as a transitional base for the hospital, The Senorita Nhlabitha Hospital. At the same time, the hospital is located outside of the Ladybrand town portions.

The site chosen is ideal for its proximity, less than a kilometre from the town square. This allows users of the building to complete daily activities (get to the taxi rank, go to the bank, go to the post office.) The building can serve as valuable integration within the community.

The site has access to daylight from sunrise to sunset. The back of the site is against the building due to the back of the building being a mountain. It will allow for off-grid services and block off against winds. This will block the winds approaching the site. The site rises as well, giving a scenic view of Ladybrand.

The building has two entry points. One entry on Collin Street, more accessible to the public and a private entry from Van Gorkum Avenue. Van Gorkum Avenue is a more private entry that is guarded by private residential units. The site is located next to a school, a non-profit organisation and a great social space.

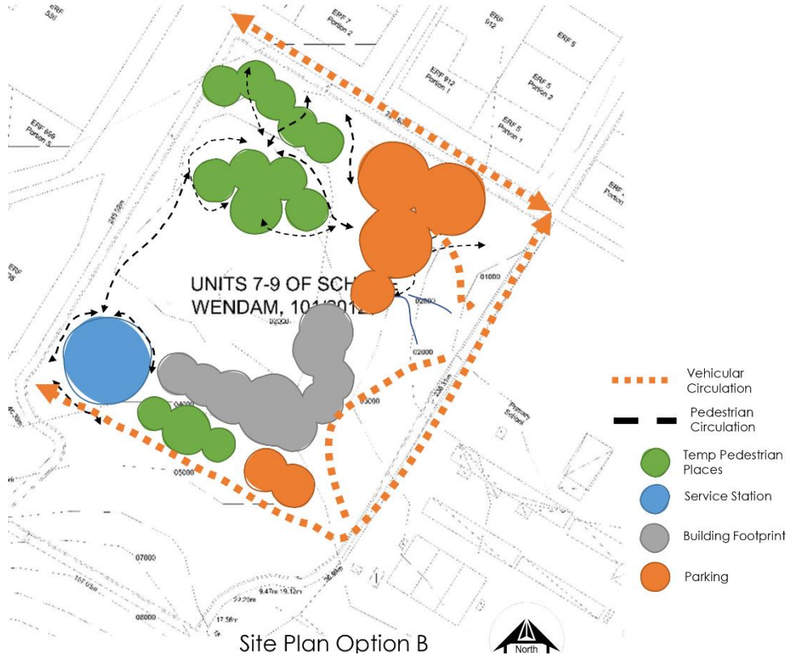


Figure 73 Site Diagram Layout A

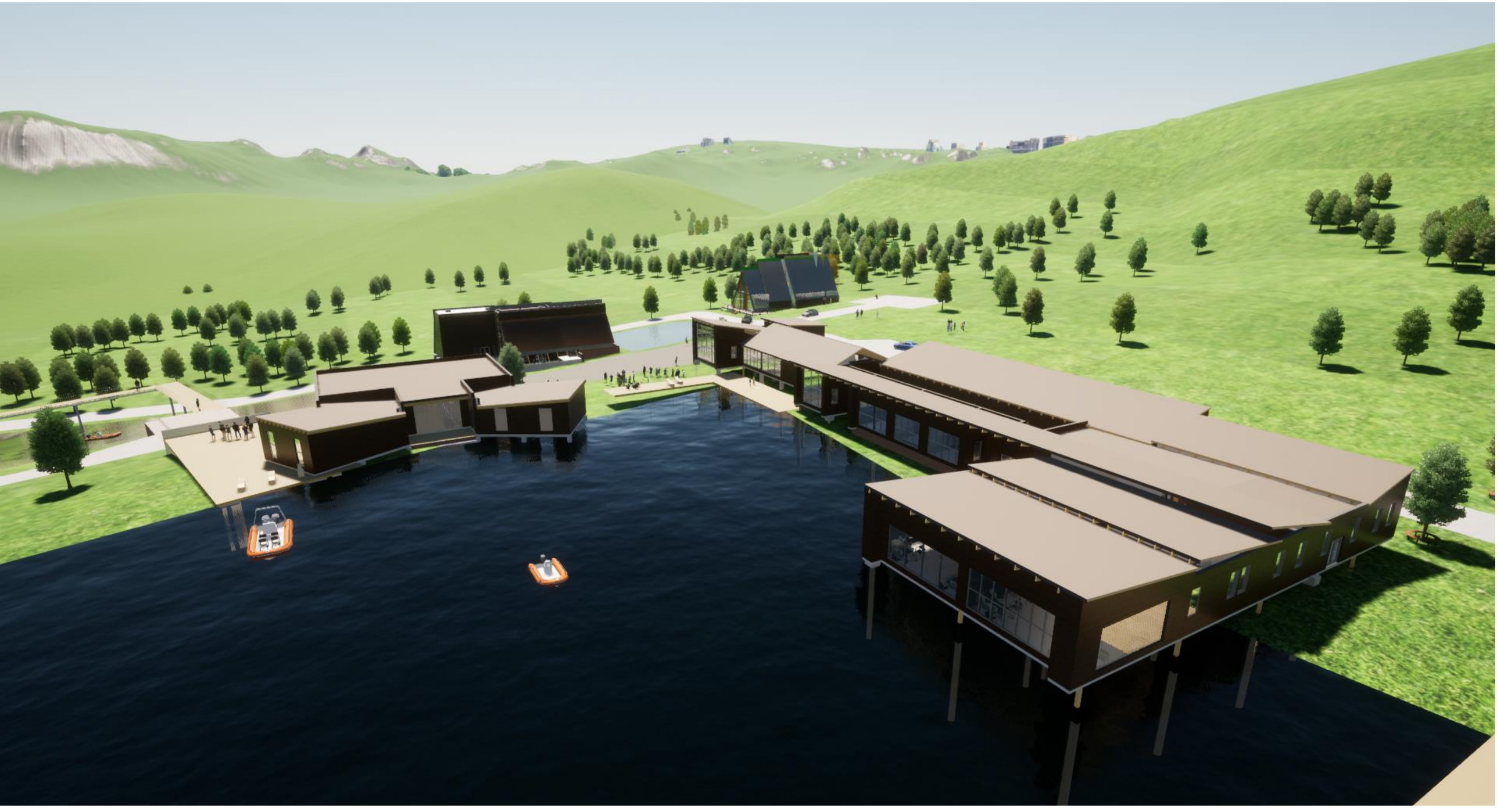


Figure 74 Healthcare Centre by Kamohelo Motopi 2022

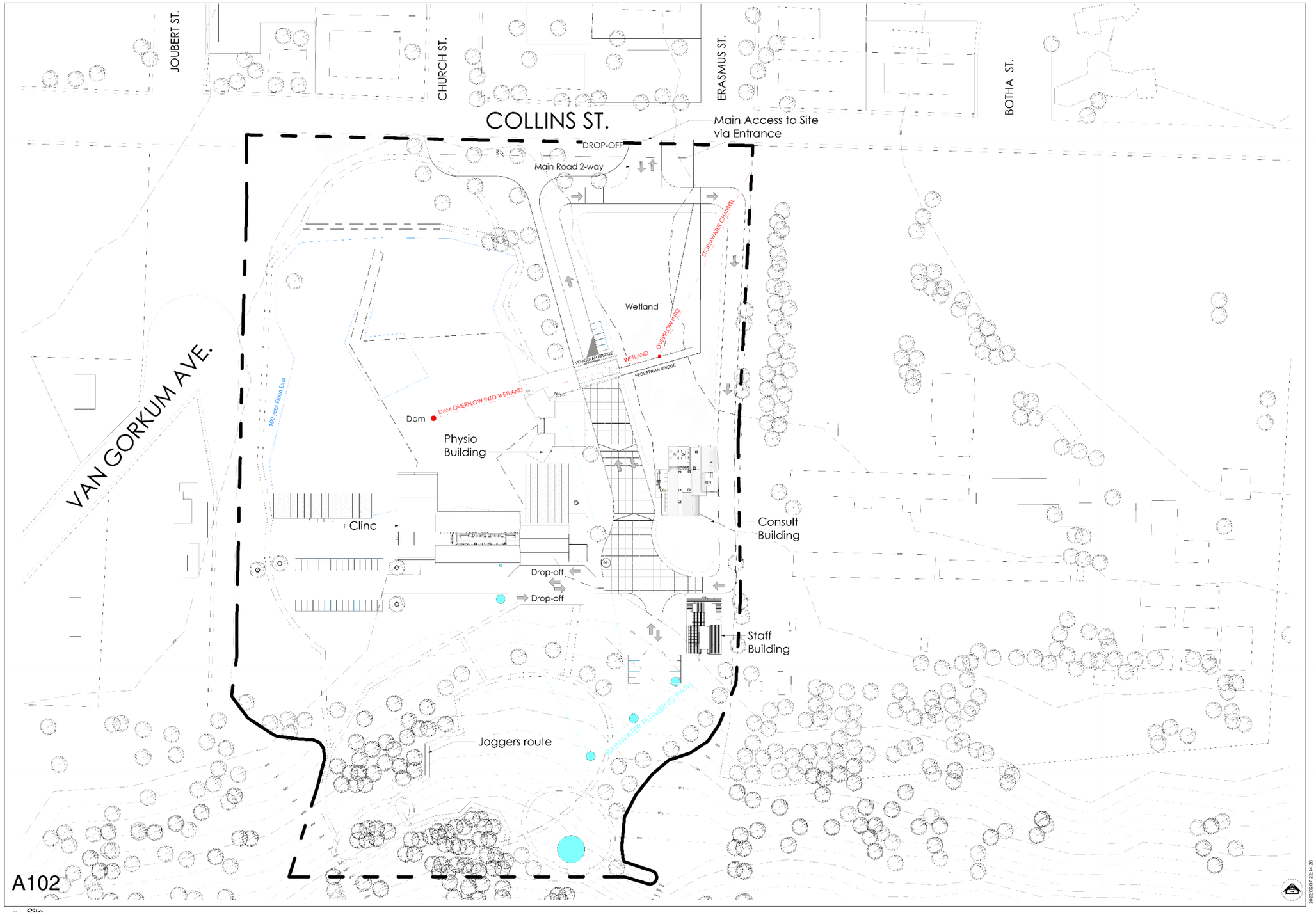
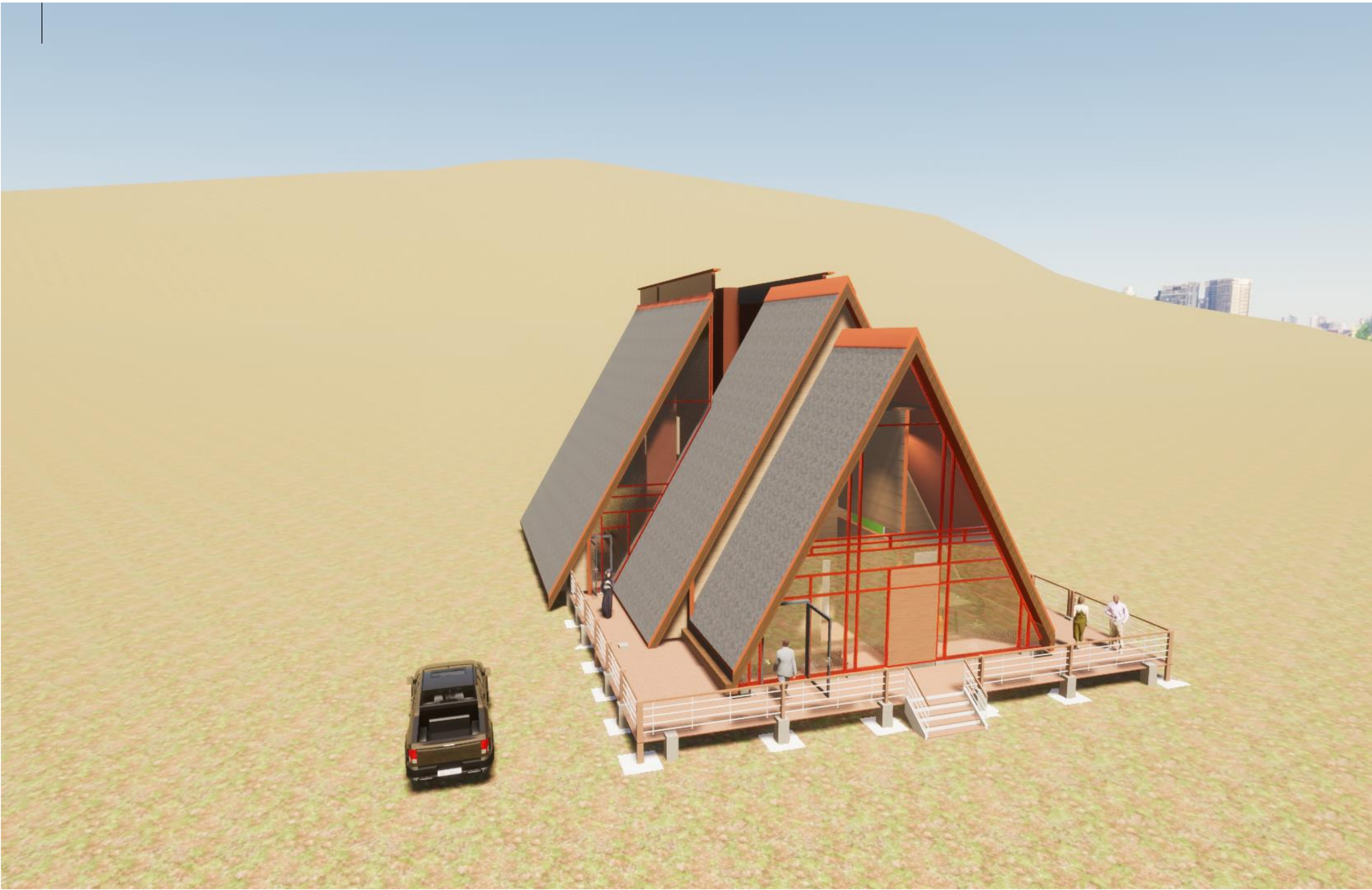


Figure 75 Site Plan by Kamohelo Motopi



The proposed design recommends that the design be approximately 73m^2.

The program of the building shown in the floor plan (Figure 77) shows temporary sleeping areas for staff, bathrooms, a sitting area, a kitchen, storage, an entrance area and an office. The size of the building was chosen as this building is a temporary getaway space.

In figure 77, we see that the male and female sleeping areas will be private with lockers and bunk beds, as the storage will also be private. The Floor Plan shows that sleeping areas, kitchen, sitting area, entrance area, and office should have Direct Light, and the bathrooms and storage use diffuse light.

The back of the building allows a private outdoor area for the staff to gain outdoor air and sunlight with the privacy of the front. The back of the building is also the connection to the In looking at Figure 67 (East Elevation) and Figure 66 (Section through Entrance Area and Office).

Direct light is getting into the office, sitting, entrance area, and kitchen. The extended height of the façade allows light to travel past the entrance area. The long

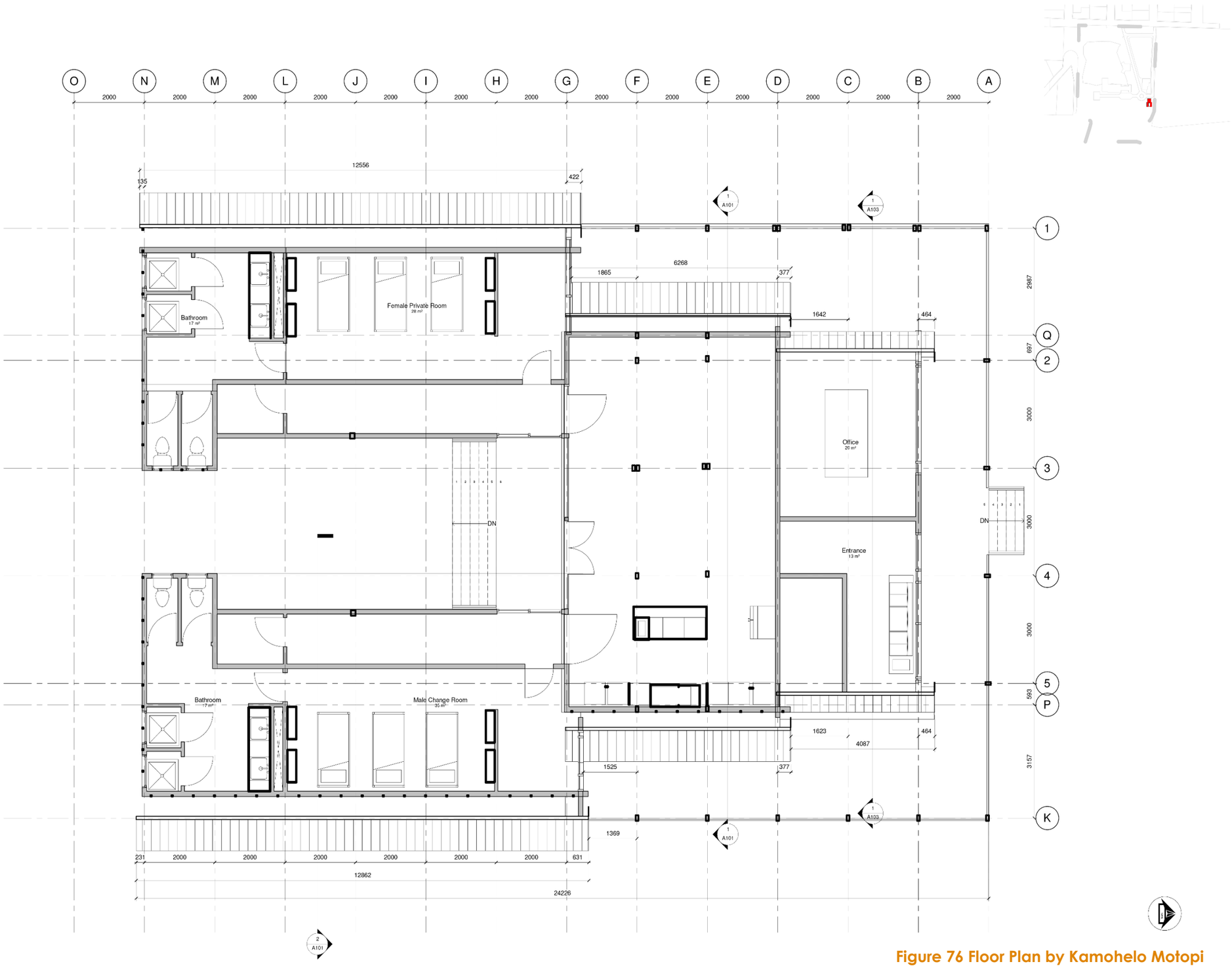


Figure 76 Floor Plan by Kamohelo Motopi

façade works the same in regards to the staff sleeping area. the main

Above the main beam reasts where the light enters the space because of the height. This could later be used as an upstairs viewing area into the town's surrounding—40 sqm.

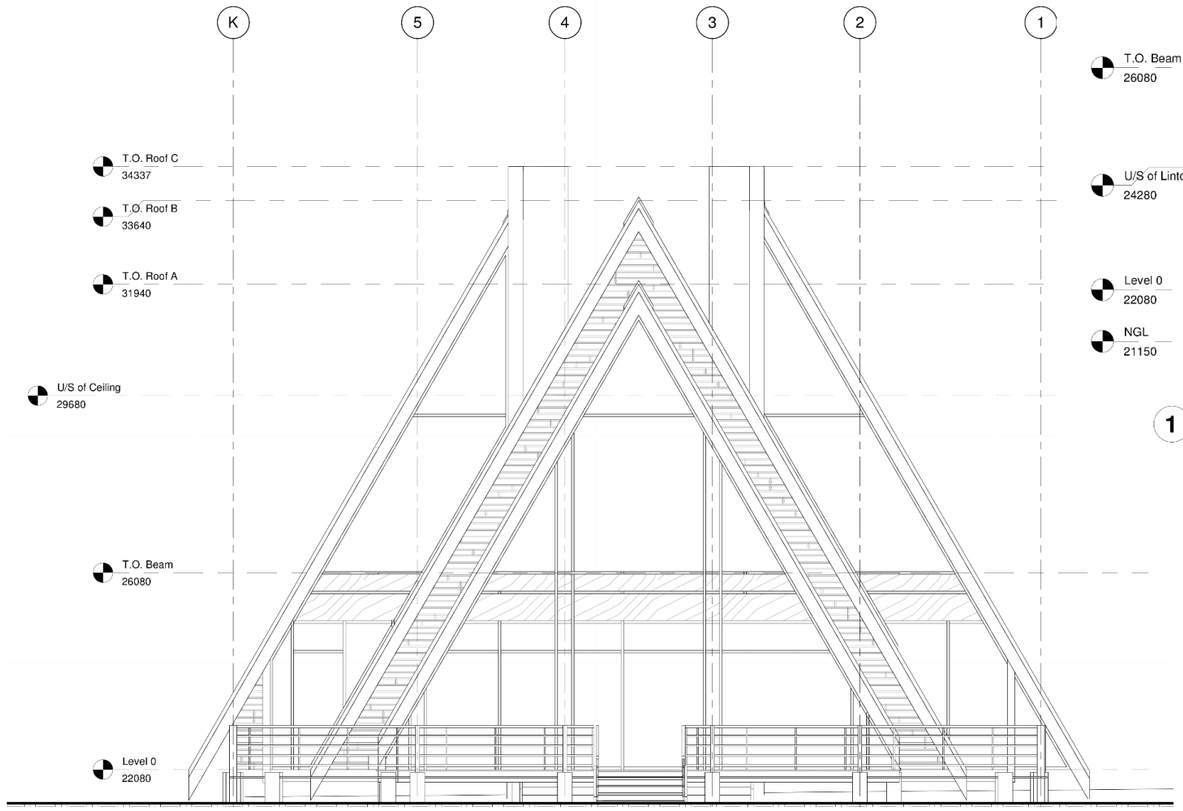


Figure 77 Staff Front Elevation View by Kamohelo Motopi

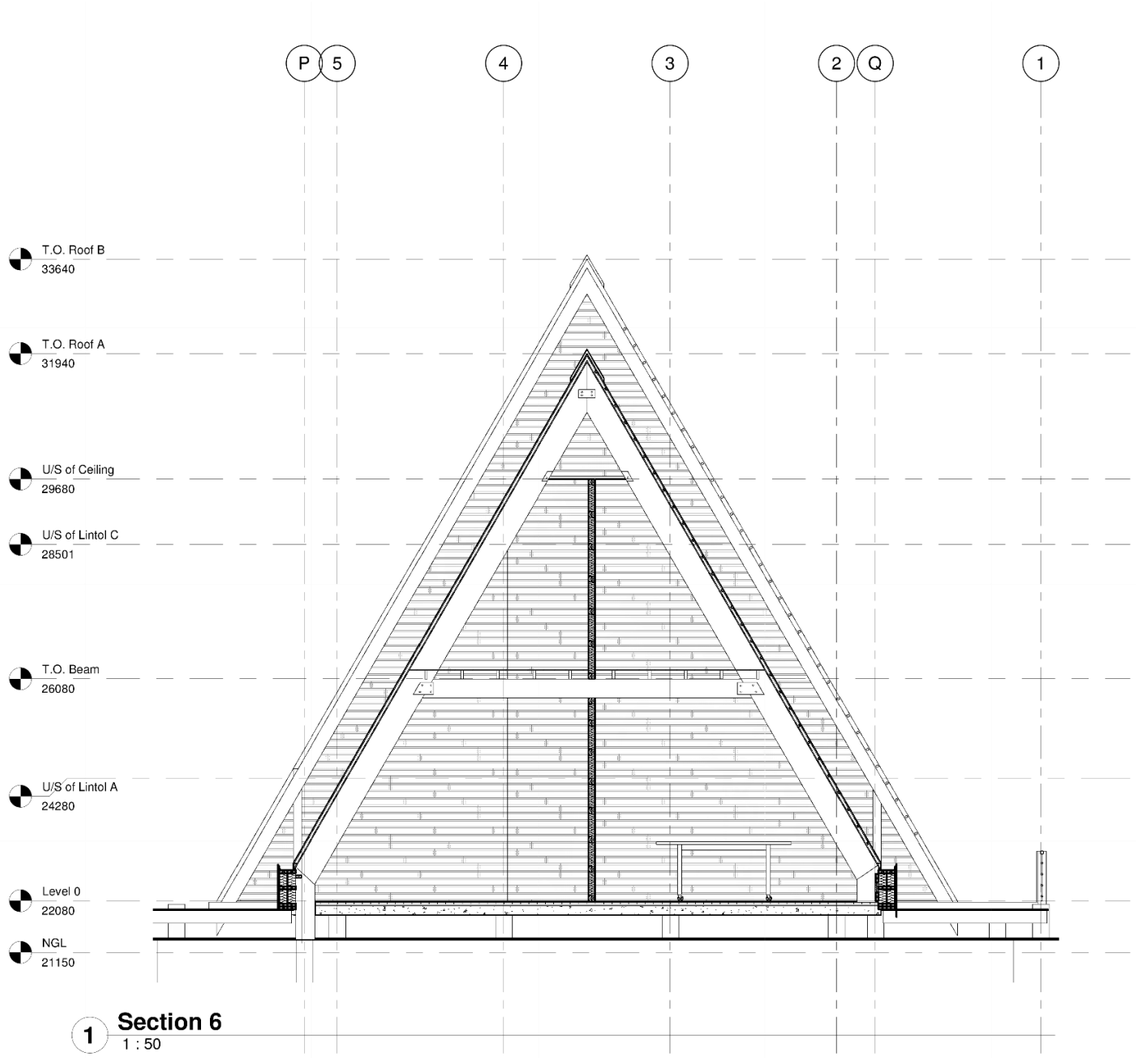


Figure 78 Section Staff Building by Kamohelo Motopi

Previous Physio Building Iteration

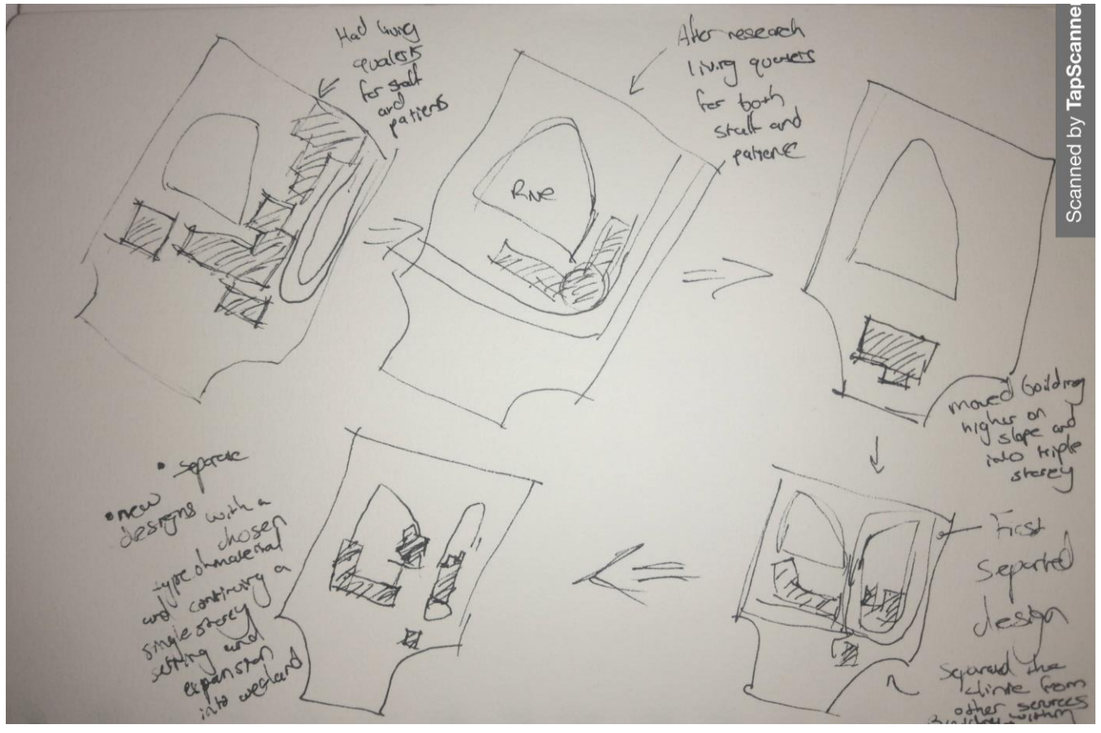
The previous design ideas for the healthcare centre went from a large centre with patient living quarters. They mainly focused on dementia patients to a clinic for patients with intellectual disabilities.

The first design began with a large clinic, shared staff building, and patient buildings placed at the northern portion of the building. After the research was completed, it concluded that the community would not be comfortable leaving their elderly patients to stay in living quarters without a family member taking care of them. The living units were removed and mainly focused on the clinic itself and continued to rise to a double storey.

The next iteration of the design moved to the southern portion of the site, the steeper portion. It was there that the significant hospital theme was relooked and notified that it did not fit the environment it was meant to be located.

The next iteration of the building was the first look at the split buildings, the clinic, the physio, consult and staff building. This design seemed to share the logic I wanted and separated them, allowing for more public spaces.

The final iteration of the buildings still kept separated but also incorporated more biophilic practices that I wanted. More light entry, green materials that resembled nature.



Physio



Physio Building

The physiotherapy building is made for two groups of users.

The users who wish to use the space to work out and keep healthy

The users who are using the space for a recovery

The proposed design recommends that the design be approximately 511m^2.

The reception area is zoned as a private area. Even though it is a space with direct contact with the public, the reception goes to the private staff kitchen and their only private bathroom.

The design aims to ensure that human traffic will be the most natural daylight. The studios also have a break of an outside area between them, allowing for nice space for cross ventilation in spaces that will be designed for exercise, healing and pushing the body.

The studio areas have a sloping roof to maximise light entering the building and allow for space for cross ventilation

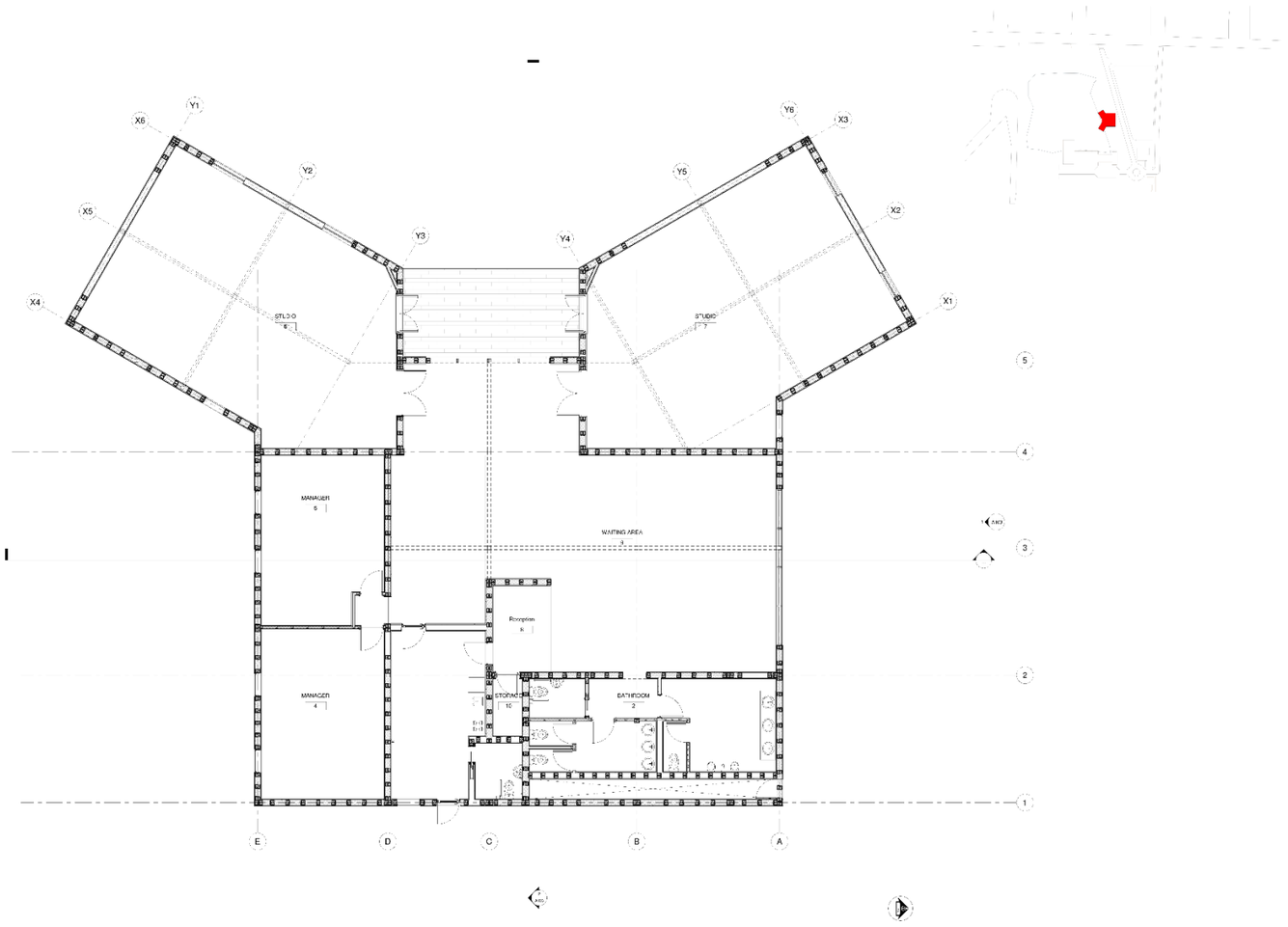
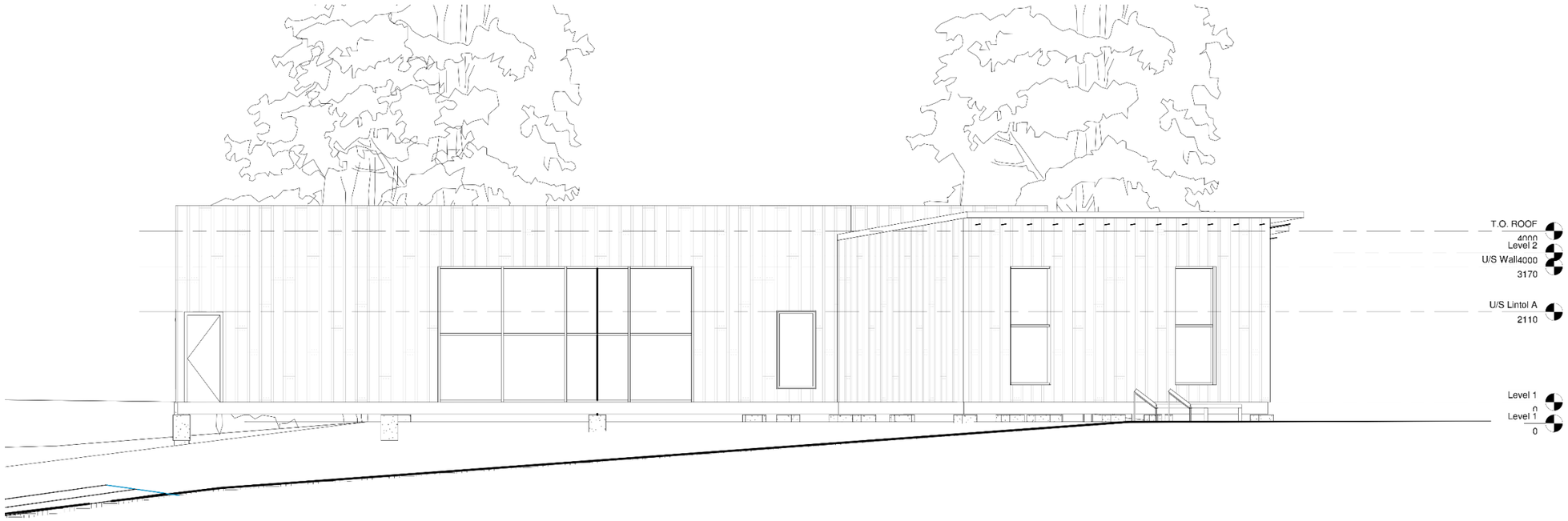
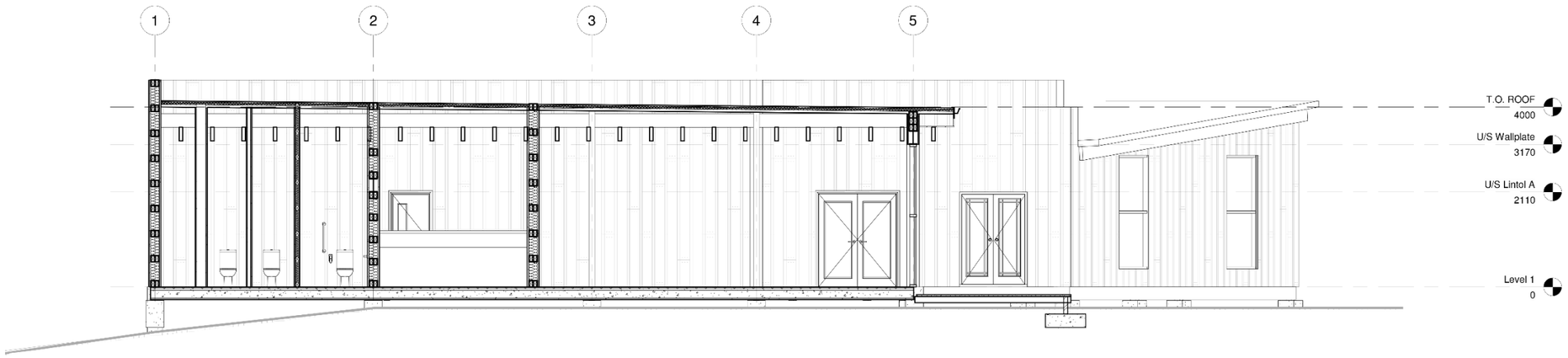


Figure 79 Physio Building Floor Plan



1 East
1 : 50



A103 2 Section 1
1 : 50

Figure 80 Section 1 & East Elevation



Figure 81 Consult Building Render by Kamohelo Motopi

Consult Building

The consult building is made for two groups of users.

The users who are patients coming to keep their mental health up to date

The users who work in the consulting building

The proposed design recommends the design be approximately 511m^2

The North Elevation (Figure 79) shows how light entry is maximised with the curtain wall in the building and the high walls towards the North facing form.

The bathrooms of the building are located on the southern end of the building. Also, on the southern and eastern ends are Gardens. The intention is to bring morning light into the darker space of the building. As a point of note, the consultation offices also have openings allowing the sunset to shine into them, but between consult offices 1,2 and 3 is an outdoor viewing area for the patients and family to get a view into the town.

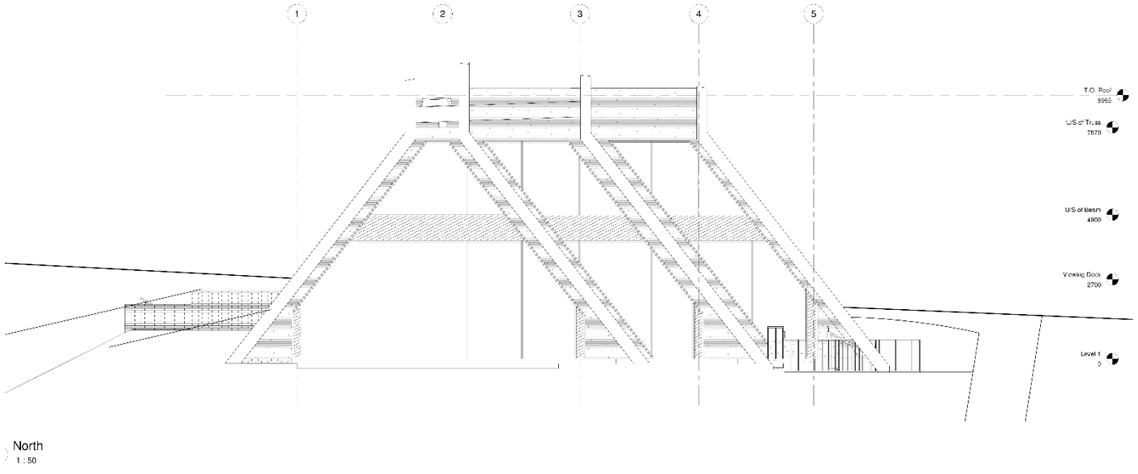


Figure 83 Consult Building North Elevation

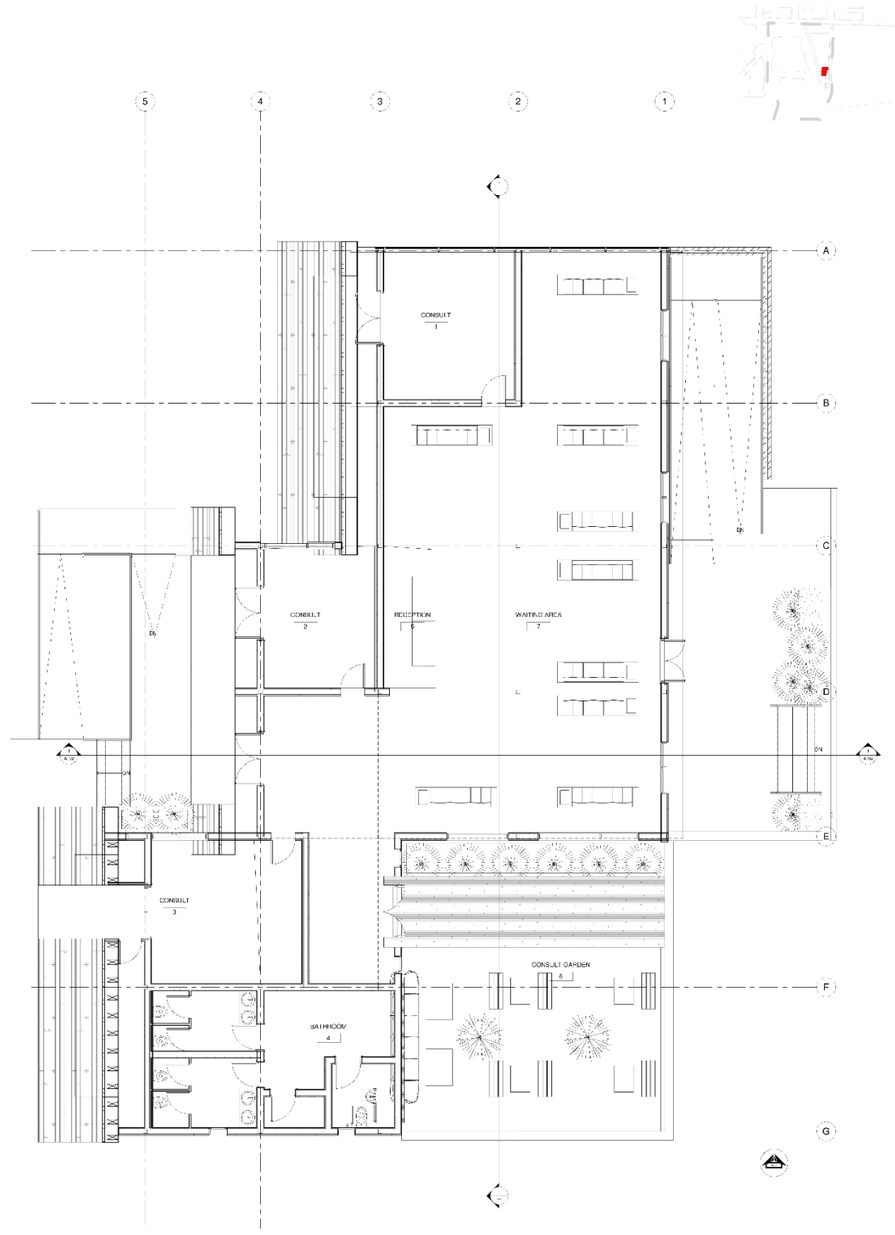


Figure 82 Consult Building Floor Plan

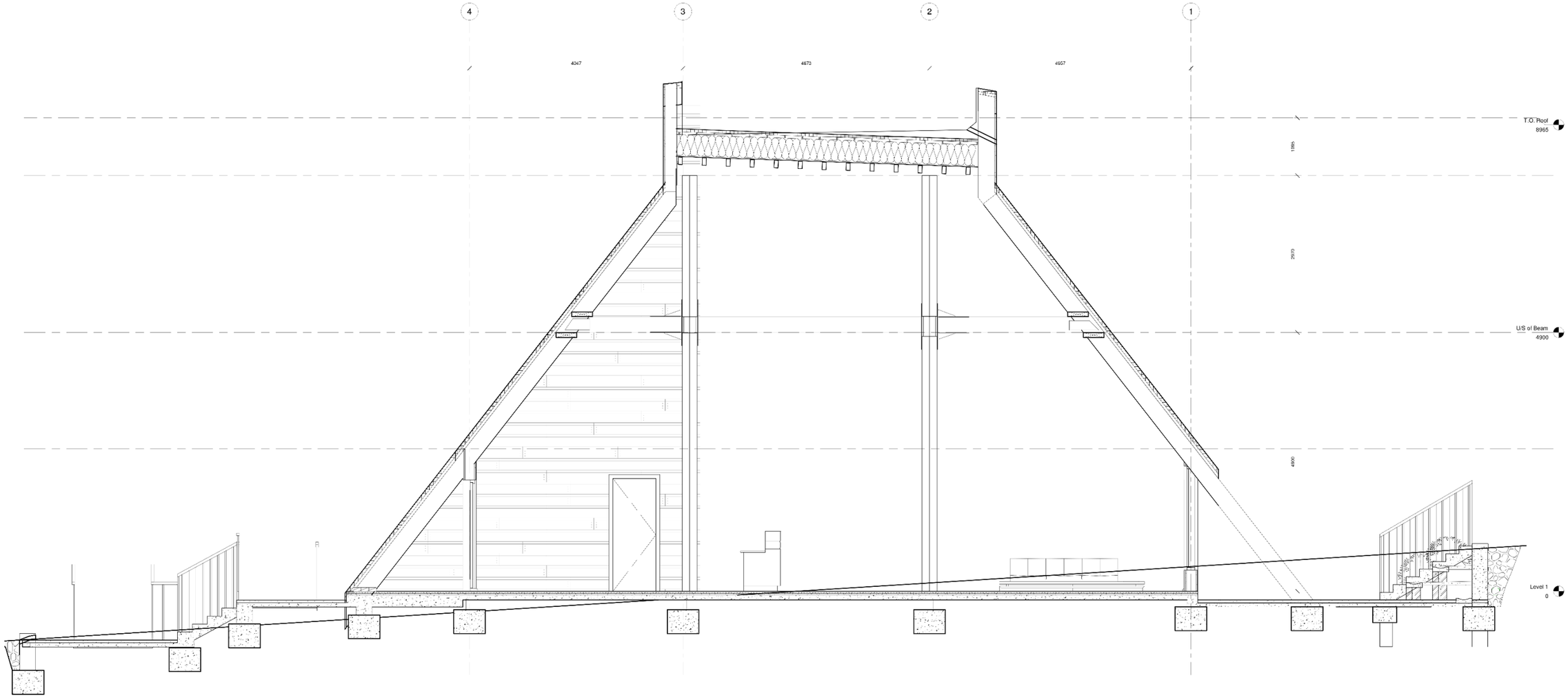


Figure 84 Consult Building Section



Figure 85 Clinic Front View Render by Kamohelo Motopi

The Clinic

The clinic is the main building for the project. The clinic is separated into three sections:

1. Entry
2. Treatment
3. Recovery

The Entry wing has the following spaces inside:

Entrance Foyer for visitors and patients to enter. The Waiting Area directly next to the Waiting area is the Dispensary and Reception. The reception has direct access to the storage room, the treatment wing and the passage leading to the cashier deliveries and orders. The Southern facing parts of the Entry are where the drop-offs will be for the clinic. The deliveries & orders are situated there, and the bathrooms and ducts also.

About the treatment wing, the treatment wing is split into three key spaces: The break in the building is treated as a courtyard, offering a break in a very long building. By calling dual space traffic, the dual traffic space means the space where people from the recovery and entry may come through. The dual traffic space has doctor's rooms and waiting for areas directly next to the rooms. These spaces act for consultations where a long-term procedure will not be necessary. The spaces will be designed for each professional as to their requests.

The last space is the one-way entry, meaning calling the space one-way entry about entering from the recovery space. By this, a person will need to be accompanied by a staff member.

The final space is the Recovery Unit. The space acts as a temporary recovery space for

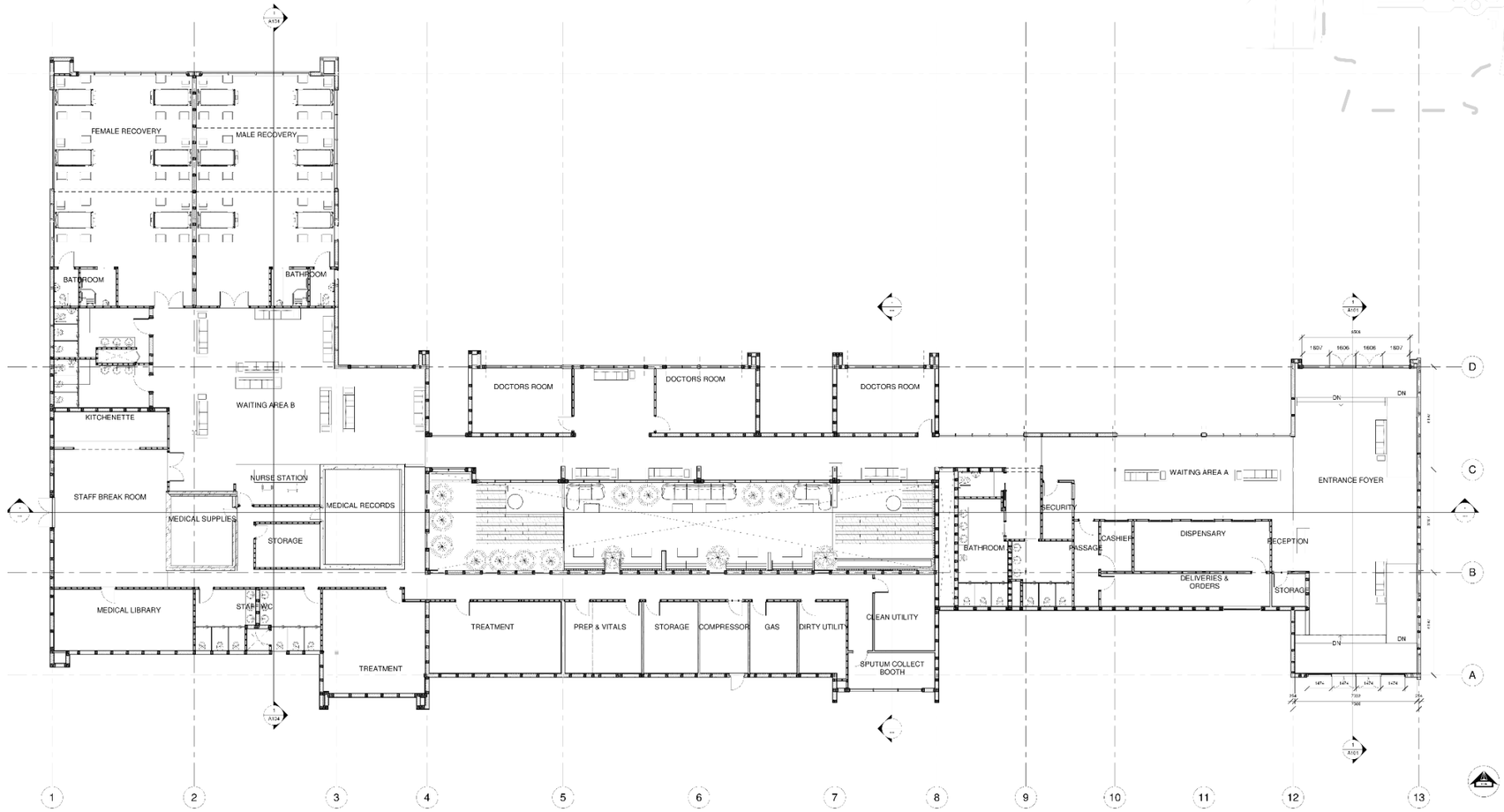


Figure 86 Clinic Floor Plan

patients. The Recovery Unit also has a Staff Library section that connects directly with the staff building.

SECTIONS

In section 1 of the clinic, focused on the welcome area, figure 87, the first goal is to offer cross ventilation from the northern side to the southern side of the building.

When looking at section 2 of the clinic, figure 88, the light enters the waiting area. It allows for the dispensary to gain access from the northern light. While there is no cross ventilation in this space, there is the allowance of light in the public spaces.

In section 3, figure 86, the section cuts through the waiting area, the procedure room, and the consultation space. The consultation room has light entering the space, but the procedure room does not have direct north light coming into the space. The overhang differences show how the north light does affect the space during lunchtime. The section also shows the elevated level height of the building and the slope of the site as it goes into the dam. The height is high to handle the occasional rain that occurs if the dam overflows during the Christmas break (mid-end to end of December).

Section 4, figure 90, cutting through the recovery room, waiting areas and rooms specifically for medical staff. The section shows the long windows to allow light to enter the recovery room and the west elevation of the building light from the sunset to enter the building. The allowance from the light to enter the building will allow the patients to know when sunrise and sunset are. This will allow patients not only the chance to be able to know the time of day but gain views of the town of Ladybrand.

The use of courtyard also serves as a maintenance door to be able to treat any plumbing issues. Referring to the floor plan, figure 83, the bathrooms for staff and visitors are on the southern end. In section 5, figure 89, there is a walkable duct for a plumber to walk through the passage with their tools. There is no direct view into the ducts throughout the buildings, but they allow privacy for patients not to see work being done. The patient's recovery bathrooms have been placed in western and easter-facing walls of the recovery rooms.

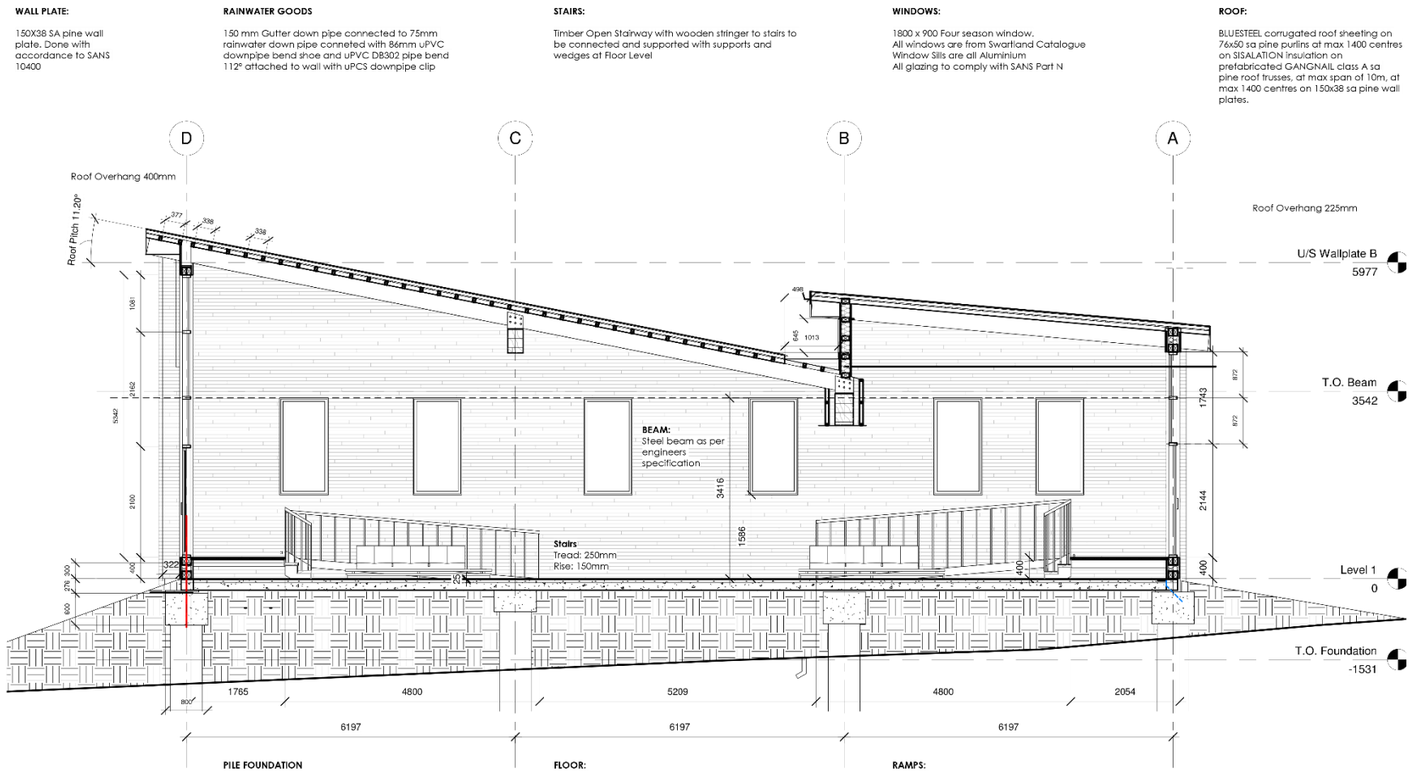


Figure 87 Clinic Section 1

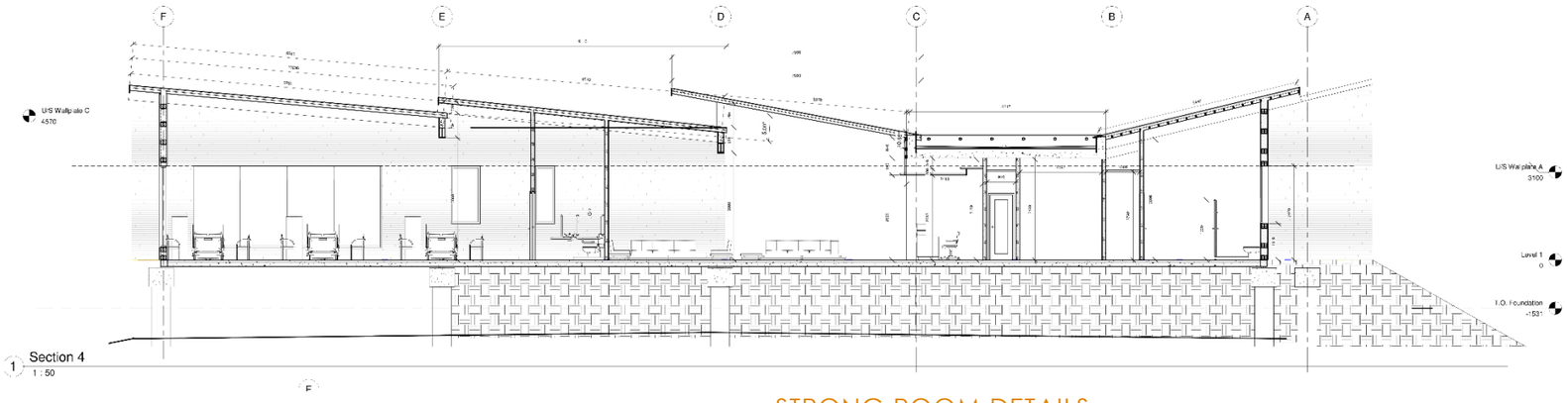


Figure 88 Section 4

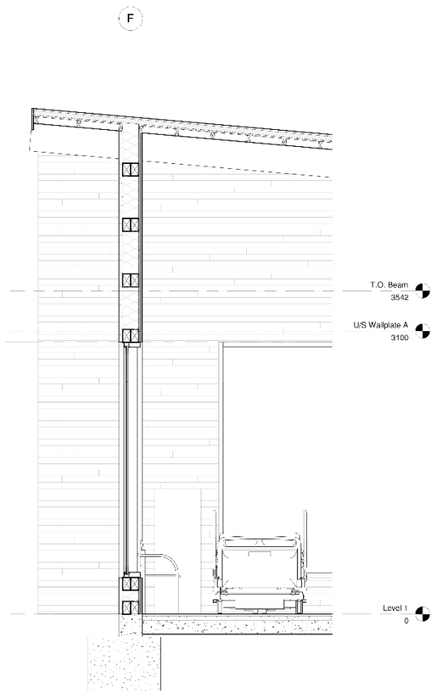
STRONG ROOM DETAILS

The records room of the hospital in section 5, figure 89, shows a records room and a medical storage room. The medical records room is meant to be made from a concrete wall. In the detail of the medical records room, figure 92, the wall is made from a minimum of 200mm thickness. The thickness of the wall is advised to be recommended by the facilities manager of the facility. This can only be good advice if the facilities manager has experience with concrete work and general construction.

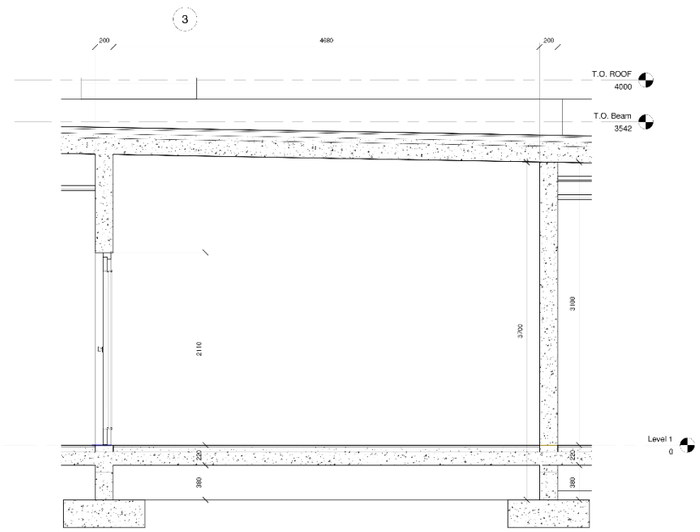
A facilities manager ensures that the functionality, comfort, safety, sustainability, and efficiency of the built environment ensures the functionality, comfort, safety, sustainability, and efficiency of the built environment - the buildings we live and work in and their surrounding infrastructure.

I believe that for this reason, an Architect would be ideal for designing the specified substantial room and being able to specify where an engineer would be needed. This could be an Architectural Facilitator.

The medical supplies room detail, figure 91, was an idea that I wanted to implement brickwork and minimise the amount of concrete needed in the storage room. This design could be used instead. Concrete will still need to be used for the lintels, foundations, and a beam above the roof. This detail should be offered as an alternative to reduce concrete usage within a building.



2 Section 4 - Recovery Room
A
1 : 20



4 Section 5 - Records Room
1 : 20

Viability Report

EXECUTIVE SUMMARY

This chapter provides an analysis and viability of designing a clinic in the Free State. There will be an analysis of the building and design team. The analysis will include analysing materials used in this report. The research investigates the usage of various materials in the Free State province and smaller towns, the connection with communities, and unexpected costs that will need to be evaluated for the project construction to begin.

The valuation of the property site and relevant studies. The report shares the outline of the project, how the government selection in this project would be determined, and the private portion of the contract. This will describe the property and investigate the building costs. Looking at the restrictions and town planning requirements is critical to understand the financial restrictions and their effect on the construction and designing timeline. This report will also explain the limitations of specific materials far away from cities, especially when working with not common materials in the area.

The choice of contracts and the timeline will explain the other factors to ensure that the project commences successfully, the considerations of each design and construction team, and the financial aspects towards the correct building. The first choice for material would be CLT (Cross-Laminated Timber). It is structurally a strong material and a green material. The problem with CLT in the selected site is the distance to get the materials. The closest CLT bases are Cape Town and Durban. The trip from Cape Town alone to Ladybrand would be over 12 hours (Figure 62. The issues with using a material such as CLT and evaluating the considerations regarding construction, labour, and transportation.

The proposal for the report is a public clinic with a private wing that focuses on elderly patients with intellectual disabilities, especially Alzheimer's and dementia patients. In this context, we must remember that patients and families and smaller towns usually have a designated family member to be the caregiver. The centre will offer medical consultations and teaching facilities for them.

The problem with Alzheimer's & Dementia is a degrative disease, so residential units will be provided after a patient needs extensive care or to be monitored after an operation. It is recommended that CLT construction considerations viability from Cape Town manufacturer HWZ International.

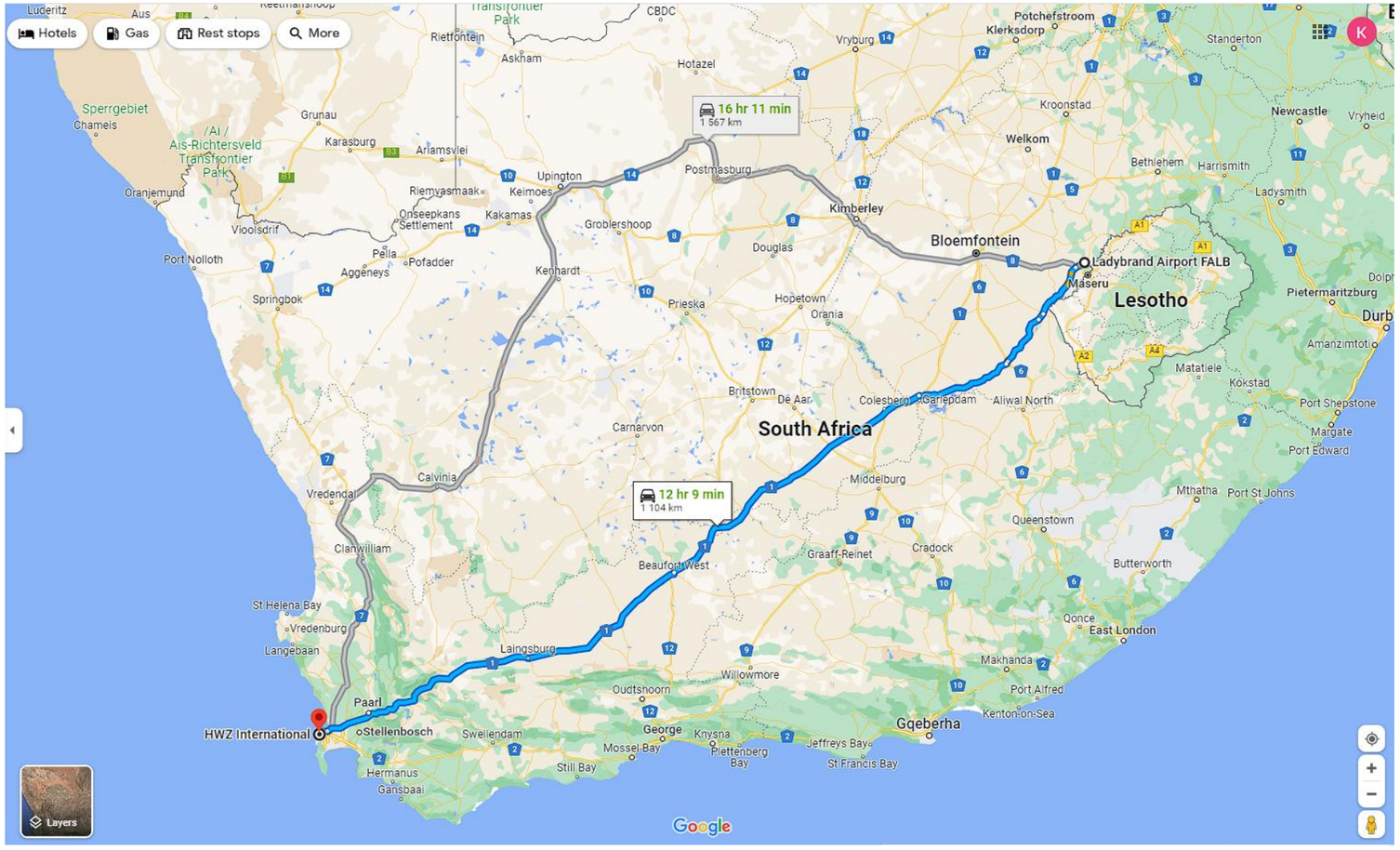


Figure 89 Distance from Ladybrand to HWZ in Cape Town from Google Maps

The report will adopt a method to introduce new technologies into smaller towns and find community support. A part of the report will contain community liaisons for both men and women. The report will also investigate the timeline with methods to achieve the desired outcome.

"Unless you have definite, precise, clearly set goals, you are not going to realise the maximum potential that lies within you." Zig Ziglar

CLIENT

The clients would be separated from the clinic, the government, and a private group. Government has a public budget of R 200 billion to be spent. With 10.8 billion (approximately 5%) given to the Free State. With roughly R 324 million (3% of the Free States budget) and R 108 million to be assigned to transfer to households and NPOs (1% of the Free State's budget). Here the recommendation for the transport services and the infrastructure can be proposed for the entire province.

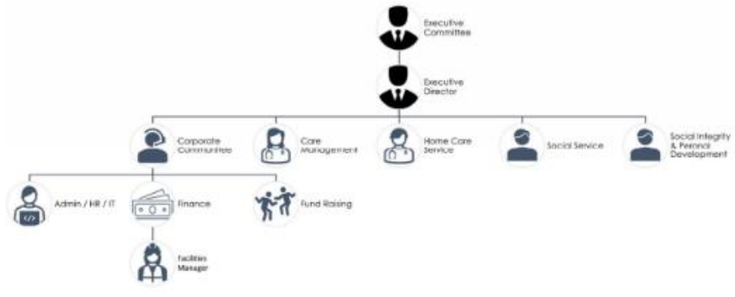


Figure 90 Private business hierarchy diagram by Kamohelo Motopi

The proposal for this system can be used as clinic systems to be assigned for towns and locations in more remote locations, significantly reducing funds. These systems are ways to reduce medication costs and build on job creation. Money on Goods and services can be reduced. The other group to consider are the patients living in Lesotho. The average salary of M 9400 cannot afford private care. However, with the guidelines of South African healthcare, the Basotho people should be considered for the centre.

The private wing client would be considered a healthcare group business with hospital-based services in chronic medical, institutional mental healthcare, clinical treatment and care, rehabilitation, and environmental support. As part of their design team, they will require their homecare guidelines and care management guidelines to the Architect and Design team. The Funds of their project will have to be dispersed by their financial sector and their representative to see when working will be. The client has arranged for the facilities manager to help us with any building required.





The Funds of their project will have to be dispersed by their financial sector and their representative to see when working will be. As part of their design team, they will require the Architect and Design team's homecare guidelines and care management guidelines. The client has arranged for the facilities manager to help us with any building required.

For a public company to issue a public system, a process needs to be followed for this system. The government allocates specific funds to each province's healthcare sector. A limit of funds is allocated to infrastructure, with approximately R324 million assigned to infrastructure in the Free State. Funds need to be allocated very specifically. For governments, we need to remember that the objectives are to keep the health and well-being of its community members.

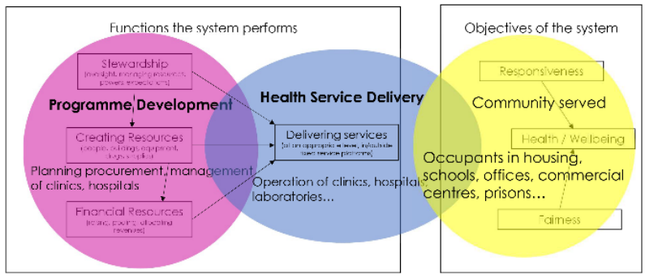


Figure 91 Health Systems Performance and Delivery Framework Diagram

THE NEEDS OF THE COMMUNITY

Estimated patient load clinic can take

Viability Report

Project Plan

Investors Report

LIFE CYCLE OF THE PROJECT

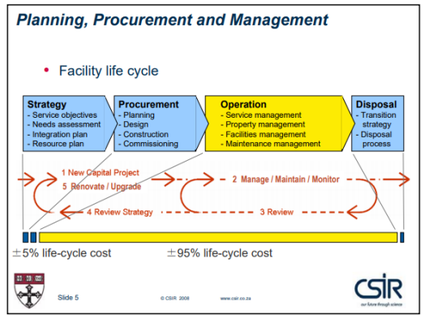


Figure 93 Planning, Procurement and Management by CSIR

To fully understand, the government needs to consider the facility's life cycle by understanding the objectives of designing this clinic in Ladybrand. The government has previously created a new hospital between the outskirts of Ladybrand and Manyatseng. No clinic meets the needs of elderly patients living in Ladybrand, Manyatseng or neighbouring areas. The clinic can also provide aid for patients living in Lesotho. The average pay for patients in Lesotho and Ladybrand goes from R9 400 to R29 000. So private medical aid would only work for a tiny group.

THE INFRASTRUCTURE PLAN.

The setup for this tender begins by selecting the site, followed by the design section. After the design process is complete, the commissioning and construction section is meant to be handled and closed off with the operation and maintenance, as per figure 40.

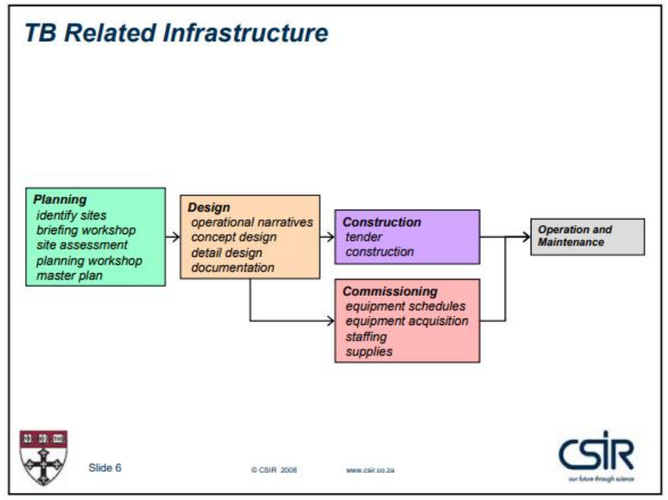


Figure 92 TB Infrastructure Diagram by CSIR

PLANNING OVERVIEW

To follow through, we must understand the health service, the community of Ladybrand, the existing infrastructure and available resources. The needs for the sites, the briefing workshops, site assessment, planning workshop and the master plan.

THE SITE

The site location needs to be considered for a healthcare facility. The site's suitability will depend on the facility's fate and utility for the public in the future. When selecting the site, there will be a demand for more beds and planning for expansion later. The site should be large enough to plan for future expansion. It is ideal for the healthcare facility to be close to the town square and residential areas in a town area. Another factor to consider is if the facility is in proximity to taxi circuits, especially if a public facility needs to be placed in planning. Accessibility is a crucial factor when selecting a healthcare facility. It is more ideal for the centre to be located close to the heart of an area.

The chosen is in Ladybrand, a small farming town 18km from Maseru, the capital of Lesotho. Ladybrand is a town built with a few hills' parts of its cityscape. The site is approximately 6.8 hectares, with a dam placed on it. The site has its back on the mountain while resting on a high point of a hill. The original site was subdivided and rented out as separate homes. For this project, we aim to consolidate and rezone three portions of the site.

The site is approximately 10km from the city centre where the leading supermarkets (Shoprite, Cambridge, and Spar), Banks (FNB, Nedbank, ABSA, Old Mutual, Capitec), couple of restaurants surround the capital. The site has access to a bus stop, used by Intercape, private taxis and public taxis.

SCHEDULE OF RIGHTS

An overview of the Town planning requirements will require a consolidation of the site, as per section 6, diagram for 3 of the subdivided portions of the site: site schemes 7,8 and 9 of the Wendam 101 Scheme. The sites need to be owned by the clients before the consolidation can be put into fact. If the municipality approves the consolidation, the client must appoint a Land Surveyor to survey the consolidated property.



Schedule of Rights

	Permitted	Proposed	Compliant
F.A.R.	1.2	0.05	✓
Coverage	50%	40%	✓
Use Zone	Residential	Multi-Special	Requires Rezoning
Density	8 People per House	80 - 120uha	
Height Zone	3 Storeys	1 Storey	✓
Building Lines	5m	5m	✓
Parking Requirement	2 per House	6 per 100m2 GLA	Requires Rezoning

Figure 94 Schedule of Rights

One scheme will need consolidation because banks will not understand the reasons for separated subdivided sites working together. Here, the planner will need the original SG diagram for the approval and consent letters from the neighbours. The municipal may ask for a traffic impact study because the site is close to 2 schools.

This will help, but it will be a cost that the client will need to fund. The client will also need the town planner to make the rezoning application. The client will need to meet with the town planner and require the title deed (Figure 68 Schedule of Rights by Kamohelo Motopi) to see if any restrictions need to be removed for the site. The client must give the Town Planner Power of Attorney. Once municipalities approve the application, the site may be advertised. This process is time-consuming as it can last 6 – 7 months, depending on the Town Planners' networking skills and workforce. The town planners do have the correct town planning scheme. Meetings will be held between the right building control members and town planners.

A civil engineer will be needed for bulk services to add multiple residential buildings and a commercial building. There needs to be a re-look at the water, sewage and electricity. The process regarding rezoning will require bulk work. The site has roads going into the site and electrical, sewage and water services for the residential section. However, the centre will need bulk services as that building has a more significant population. Town planning will require a traffic impact study based on the site's proximity to the school and the proposed densities. The centre does have compatibility as the residents will be able to walk to the centre. In terms of an SG diagram, a Land Surveyor will need to make a new SG diagram for the new site after consolidation for a municipality and the client. The site conditions. The site area is approximately 6.84 hectares. The site slope rises to 7m as it faces the mountain. The site FAR that is recommended with the approved design will still be met.

Regarding development rights, the site falls under the town plan scheme. However, the site's primary uses are for residential units and stayovers, so the rezoning also needs to allow for commercial and medical usage. Currently, the site does not comply but will need to for designs to begin. Luckily, there are no Heritage restrictions on any buildings currently on the site.

Technical Aspects

Structure Both buildings have different structural considerations. The centre needs to have structural considerations for the building and be treated for the structural elements that sit on the water. The residential building needs to be considered for the retaining wall needed, especially for the site implications. The CLT experts will be requested from HWZ. At the same time, a structural engineer will be appointed to ensure all designs are structurally secure. Structural experts will not be available in Ladybrand.

ACOUSTICS

The acoustic elements must be designed for acoustic settings, especially for the x-ray labs and classrooms. For this project, the recommended wall decibels would range between 50 – 70db. This is in a stance to recommend sound charts. Sound specialists will be required for the classrooms. The specialists will only be chosen from Bloemfontein. It will be the closest distance for the specialist to be located.

LIGHTING ELEMENTS

The lighting for the teaching facilities, medical rooms, and movie theatres. The lighting will be selected to fit into different environments. The correct bulbs will need to be chosen. The lighting specialist will require a specialist primarily in the medical theatres. This specialist will need to be brought in, but the specialist can be in Bloemfontein, granted, it is a 2-hour drive, but there will be the closest.

MATERIALS

The materials need to be from the area as much as possible, and where they cannot be a maximum of 2-3 hours from the closest city, in this scenario, would be Bloemfontein. Any other travelling would not help in terms of carbon footprint.

LOCAL LABOR

The use of local labour is not meant to be for free labour, the contract will be used for selected subcontractors, but these will be invited to bid for sub-contractors in part as a tender bidding process. However, the garden specialist will have special requests about the tender process. In Basotho culture practices, the woman was part of the gardening process (Kabi 2021), so for most of the gardening process, there will be expected for 60% of the gardeners to have female gardeners to work with the planting and flower beds and gardening. The proof of the work done with the consultants on farms is the truth. There is a local nursery for any tools to be purchased in Ladybrand.

Beyond working with gardening and professionals in the time as qualified sub-contractors, there will be no other local community liaison. The community will be invited to the open day after construction is completed to see the final product. The subcontractors chosen for this project may receive additional training, but there will not be additional training or skills development.

SOCIAL

The social implications allow for a healthcare program to be placed in small towns for private healthcare groups. Once this system applies and the project has undergone necessary revisions, this will serve as the flagship for Intellectual Disabilities Centres around sub-Saharan Africa. The benefits for the residents to have a local Centre for their elders will significantly benefit the community in Ladybrand and Manyatseng.

ECONOMIC

The medical costs will be significantly high, but the profits raised from the Doctor's rentals of their office suites alone will be a significant benefit.

The rentals for patients can go for a simple R1, 750.00 a night to R 50 000 per month, could raise a good profit and, if the project is a success, can allow for expansion on the site if the population needs more. Using the site for classes also allows communities to make bookings and take part in classes, such as first aid and working with specific patients. At a rate, the conveyer will deem it relevant.

Financial Management

The financial portion of the government project, which initially comes from the province, with approximately R 324 million to be assigned to the infrastructure and 108 million for transporting patients to their homes and Non-Profit Organisations. I recommend using R 4 million for the entire project, with approximately R 600 thousand to be assigned to the contractor and R 2 500 to be assigned to legislation work, rezoning and submission of documentation. The Mechanical Engineer to be assigned approximately R 150 thousand. The structural engineer will be assigned to R16 thousand. The Architect would be assigned approximately R 200 thousand and R250 thousand to be assigned for the reserves. The extra million is the expected cutbacks government would make towards the project.

The private party should either rent the wing or attempt to

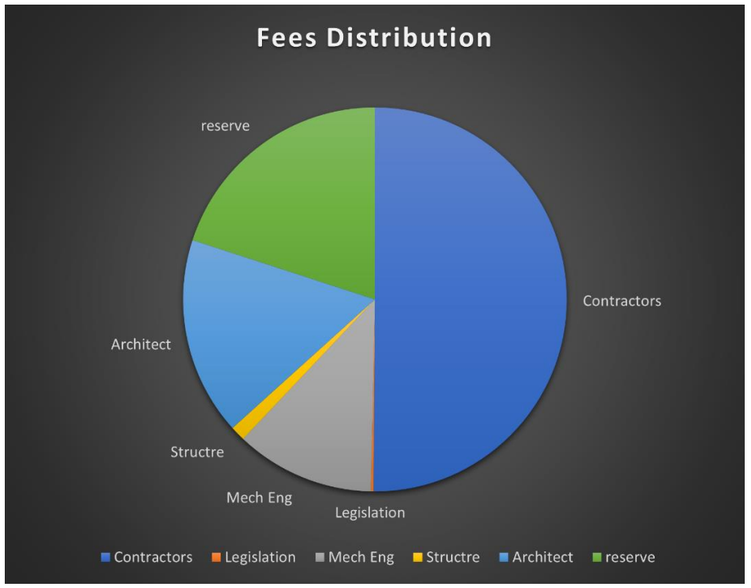


Figure 95 Fee Distribution Diagram by Kamohelo Motopi

purchase the portion regarding the private wing. This could be done by taking a loan. The Finance Officer of the company will release the money. The funds, as agreed, would be taken from a bank loan. An example from the lifecare group showed the payment plan applied to loans, and with their assets in buildings, they can add the buildings for their surety in the investments. This business is a private business. For this, the lifecare group would require purchasing the property and use their assets on page 55 of the Lifecare group 2019 financial report. It displays an example of how the loans are structured, and payments plant will be handled. In 2019 the Healthcare group (Page 34 of the financial Report) Charge all healthcare services at R130 per square meter, and the hospital and complimentary services are charged at R 3247 per square meter. Doctors will rent out their medical offices, while patients who need to stay in the clinic overnight will be charged per bed. The patients who will stay during the short term stay a day or week will have R1800 per day, while the patients of long-term stay will be charged R 50 000.00 a month. Patients overstay rates are broken into catering, room cleaning, electricity & water, gardening, and extramural activities for the residents.

Implementation Strategy

TENDER CONTRACT

The type of contract considered for the tendering process will be the Lump Sum contract with a Bill of Quantities. Due to the 3 -6 months' time for the town planning of the consolidation and rezoning of the site. This will also give the department of health to allocate funds appropriately. This will allow the Design team to start working on the drawings, but there will be reluctance as government projects are known for paying late. This will require an estimator who will know the price of the services to produce general drawings. This will allow the tenderers to bid with roughly the exact yield. If designs need to be altered, it will be easy to adjust the tender value. This type lets the client know how much the entire project will cost. However, this will have provisional costs. It will be quite the demand, and the Architect may need to charge extra hours to complete such an enormous scope of work in a short amount of time. The Bill of quantities will also take time to complete. However, the Quantity Surveyor will be a part of the construction team and will be able to work with the Bill of Quantities.

BUILDING CONTRACT

The contract to be used is the JBCC Contract. The contractor will choose a subcontractor within a 60km radius of the town square. The sub-contractor is either a nominated or selected subcontractor. All sub-contractors need to be approved by the main contractor. It will be necessary for the subcontractor that there will be a condition added to the selection process. Although in the JBCC, the client would be deemed, I would recommend that the client not have to work with the sub-contractors that the sub-contractors try to work together.

IMPACT

The project is not big enough to offer training to local community members. It can offer small sub-contractors the chance to get experience and possible experience to be a part of larger projects than the project is used to. There is no long-term strategy for this strategy, nor does the design facilitate this. The design does offer sub-contractors (for example, timber and plumbing) to be a part of the maintenance of the building, and we recommend to the companies' facility manager to call for any reports.

Conclusion

For this research, the goal was to be able to develop design techniques for a healthcare centre centred on Alzheimer's and dementia. For a reason mainly based on the selected site, the population I would be designing for would not be enough. This required me to be more open and designed for all patients with intellectual disabilities. This was allowed after looking at the research for designing spaces and finding a lot of the space techniques for medical patients (lighting, privacy and vegetation around, among other elements in design).

The research made me realise that as Architectural professionals, we not only belong in designing spaces for clients and users but are also involved in creating calming, peaceful environments that users can use. I believe an Architectural Healthcare specialist should focus more on intellectual disabilities.

This research began as an assignment to better understand how to care for my Grandfather. It has helped me understand his struggles, helps me better plan for him and hopefully helps other people in similar situations. The environment in Ladybrand and most regions in South Africa is not ideal for his level of dementia.

I had initially thought that the key solution of the design would be the biophilic design principles, which played a great deal in the design, but without the understanding of architectural design techniques (designing the building to be north-facing and understanding the benefits of cross ventilation) as well as space planning (understanding the effects of long corridors on the mind of a person).

Understand the design in terms of staff, patients and visitors and the technical requirements of rooms for a medical records room and a substantial room. Using a checklist would help a facilities manager with less technical construction work. However, the selection of solid doors and security protocols, or even solar maintenance, made me realise the use of a specialist with an Architectural background. Figure 91 and Figure 92, on page 77, show how as Architects, we can consider reducing the concrete usage in our rooms while still ensuring the security is kept to the standard.

This research also got me to understand that architecture is quite a diverse field. This needs to recognise an Architectural facilities manger. Responsible for ensuring the space is designed for the patients and staff, and also ensuring the technical work for the designs are to their respective council and for the managers of the building. I thoroughly enjoyed the learning of the disease and how to be able to design to help healthcare outside of the city, where it is needed.

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